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OCCUPATIONAL SAFETY AND HEALTH

VOLUME II

MARITIME
STANDARDS AND INTERPRETATIONS

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UNITED STATES DEPARTMENT OF LABOR
Occupational Safety and Health Administration
OSHA 2078

L 35.6/3-2

OCCUPATIONAL SAFETY AND HEALTH

VOLUME II

MARITIME
STANDARDS
AND
INTERPRETATIONS

Change 7
February 26, 1982

OCTOBER, 1972

UNITED STATES DEPARTMENT OF LABOR
Raymond J. Donovan, Secretary
Occupational Safety and Health Administration
Thorne Auchter, Assistant Secretary

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LIST OF EFFECTIVE PAGES

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*302	Change 7
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*304	Change 7
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972/Ch.8

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 8—JULY 30, 1982

OSHA 2078

INTRODUCTION

This change reflects the changes affected by the consolidation program for the maritime industry standards. Previously, standards for ship repairing, shipbuilding, and shipbreaking were separately treated in parts 29CFR1915, 1916, and 1917 respectively. These parts are now consolidated in a new part 29CFR1915 covering all facits of shipyard employment, and parts 29CFR1916 and 1917 are removed. See 47 F.R. 16983, April 20, 1982. Part 29CFR1918, longshoring, remains unchanged.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	INSERT CHANGE PAGE
Title/A	Title/A
iii thru viii	iii thru viii
1 thru 86	1 thru 86
87 thru 216	Deleted

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 7—FEBRUARY 26, 1982

OSHA 2078

INTRODUCTION

This change corrects references to appendix C, Interpretations.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	*INSERT CHANGE PAGE*
Title/A	Title/A
1/2	1/2
49/50	49/50
81/82	81/82
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2. Enter a record of this change on page i.
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972/Ch.6

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VOLUME II- MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 6—FEBRUARY 1, 1982

OSHA 2078

INTRODUCTION

This change updates the introduction to this manual.

INSTRUCTIONS

1. Substitute or add the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	*INSERT CHANGE PAGE*
Title/A	Title/A
v/vi	v thru viii

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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OCCUPATIONAL SAFETY AND HEALTH SUBSCRIPTION SERVICE

DEPARTMENT OF LABOR
UNITED STATES OF AMERICA

VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 5—OCTOBER 1, 1981

OSHA 2078

INTRODUCTION

This change updates appendix C, Interpretations.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	*INSERT CHANGE PAGE*
Title/A	Title/A
300 thru 306	300 thru 306
307 thru 336	Delete

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

L 35.6/3-2

972/ch. 4

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VOLUME II- MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 4—SEPTEMBER 11, 1981

OSHA 2078

INTRODUCTION

This change updates appendix B of this volume.

INSTRUCTIONS

1. Substitute or add the attached pages as indicated in the following table:

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Title/A	Title/A
297 thru 300	297 thru 300
	300.1 thru 300.10

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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972/Ch. 3

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 3—MARCH 3, 1978

OSHA 2078

INTRODUCTION

This change incorporates the following revision from the Federal Register.

1. Revises 29 CFR 1915, 1916, 1917 and 1918. (See 42 F.R. 37673, 7/22/77.)

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

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2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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9.72/ch.2

OCCUPATIONAL SAFETY AND HEALTH SUBSCRIPTION SERVICE

DEPARTMENT OF LABOR
UNITED STATES OF AMERICA

VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 2—MAY 24, 1974

OSHA 2078

INTRODUCTION

This change incorporates the following revision from the Federal Register.

1. Revises 29 CFR 1915, 1916, 1917, and 1918. (See 39 F.R. 15124, 5/1/74)

INSTRUCTIONS

1. Substitute or add the attached pages as indicated in the following table:

Remove Existing Page	*Insert Change Page*
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215/216	215/216
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	278.1/278.2

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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OCCUPATIONAL SAFETY AND HEALTH SUBSCRIPTION SERVICE

VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 1 — SEPTEMBER 17, 1973

OSHA 2078

INTRODUCTION

This change incorporates the following revisions or additions from the Federal Register.

1. Deletes 29 CFR 1915.3, and 1915.6 (See 38 FR 2967, 1/31/73).
2. Deletes 29 CFR 1916.3, 1916.6, 1917.3, 1917.6, 1918.4, and 1918.7 (See 38 FR 5467, 3/1/73).

INSTRUCTIONS

1. Substitute the attached title page and numbered pages for the corresponding pages in the book.
2. Enter a record of this change on page i.

This cover sheet may be retained as a record of the contents of this change.

L 35.6/3-2:

May 1973
OST

NOTICE TO SUBSCRIBERS
Volume II Maritime Standards and Interpretations

Subsequent to the cutoff date for the preparation of this publication the following changes and additions have appeared in the Federal Register through April 30, 1973.

Date	Part	Change	Description
1/31/73	29CFR1915	Amendment	Deletion of regulations establishing penalties and requiring notification of accidents
3/1/73	29CFR1916	Amendment	Deletion of regulations establishing penalties and requiring notification of accidents
3/1/73	29CFR1917	Amendment	Deletion of regulations establishing penalties and requiring notification of accidents
3/1/73	29CFR1918	Amendment	Deletion of regulations establishing penalties and requiring notification of accidents

Change #1, incorporating all of the above changes and additions to Volume II, will be issued at a later date.

OCCUPATIONAL SAFETY AND HEALTH

VOLUME II

MARITIME
STANDARDS AND INTERPRETATIONS

Change 8
July 30, 1982

OCTOBER, 1972

UNITED STATES DEPARTMENT OF LABOR
Raymond J. Donovan, Secretary
Occupational Safety and Health Administration
Thorne Auchter, Assistant Secretary

LIST OF EFFECTIVE PAGES

TOTAL NUMBER OF PAGES IS 188 AS FOLLOWS:

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*iii thru viii	Change 8	273	Change 3
*1 thru 86	Change 8	274 thru 276	Original
*87 thru 216	Deleted	277 thru 278	Change 2
217	Original	278.1 thru 278.2	Change 2
218	Change 3	279 thru 300	Original
219 thru 221	Original	301	Change 5
222 thru 224	Change 1	302	Change 7
225 thru 240	Original	303	Change 5
241 thru 242	Change 7	304	Change 7
243 thru 266	Original	305 thru 306	Change 5
267	Change 3		
268 thru 270	Original		

*Indicate pages changed, added, or deleted by the current change.

Occupational Safety And Health

Vol. II STANDARDS AND INTERPRETATIONS—MARITIME

RECORD OF CHANGES/ADDITIONS

Change Number	Date Of Change/Addition	Date Entered	Signature Of Person Entering Change

Occupational Safety And Health

Vol. II STANDARDS AND INTERPRETATIONS—MARITIME

RECORD OF CHANGES/ADDITIONS

Change Number	Date Of Change/Addition	Date Entered	Signature Of Person Entering Change

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502-508

INTRODUCTION

The Occupational Safety and Health Act of 1970 became law on December 29, 1970. Its purpose is:

> "To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; by assisting and encouraging the States in their efforts to assure safe and healthful working conditions; by providing for research, information, education, and training in the field of occupational safety and health; and for other purposes."

This volume on Occupational Safety and Health Standards and Interpretations is comprised of national consensus standards and established Federal standards. These standards are applicable to the maritime industry and are comprised of two parts: Part 1915—Shipyard Employment and Part 1918—Longshoring.

These Maritime Industry Standards were originally published in the Federal Register. They were subsequently codified and republished in the Code of Federal Regulations.

Only the Federal Register can be used as the official source or reference for such material. Every effort has been made to repeat verbatim the information published in the Federal Register; however, in the event of conflict or inconsistency, the Federal Register takes precedence as the official publication.

The purposes for publishing this set of standards and interpretations are (1) to facilitate their use through a different and easier format of the material (finding and reading specific sections and paragraphs have been greatly enhanced); and (2) to create a publication system for occupational safety and health standards, interpretations, regulations, and procedures which can be more easily maintained and revised. These standards and intepretations are available through the subscription services of the Superintendent of Documents, U.S. Government Printing Office.

Numbering System

The format of this volume is changed from that of the Federal Register to enhance usability and to provide for easier location of referenced section, paragraph, and subparagraph numbering.

Parts, such as Part 1915—Shipyard Employment, are divided into subparts, e.g., Subpart H—Tools and Related Equipment. The Subparts are composed of sections numbered consecutiveely within the Part, e.g., section 1915.72—Ladders. In this volume, each Subpart has a lead sheet listing the sections within that Subpart. Each section starts with a bold-face, center heading.

Paragraph identification levels are set in bold-face types. The first paragraph identification is set flush left; each succeeding breakdown level is indented one space to the right. Breakdown setup and types used for each are as follows:

(a) General

(1) Definition

(i) Where oxygen ....

(a) Designed, constructed ....

(1) Boiling point shall ....

(i) Hotel shall mean ....

All pages are numbered consecutively throughout.

Basic Manual

The basic manual consists of front matter, the text of the standards, and appendices.

1. Front Matter

The front matter includes the title page, List of Effective Pages, Record of Changes/Additions page, contents, and introduction.

a. Title page identifies the text of the book, date issued, date of the current change and the volume number.

b. List of Effective Pages or "A" page indicates total number of pages in this volume and lists all pages with change status and page order.

c. Record of Changes/Additions page specifies the number of change, date of change/addition, date entered and signature of person entering change.

d. Table of Contents lists the text of the manual by part and subpart numbers. It also indicates page number for quick reference.

e. Introduction describes the format and contents of this manual.

2. TEXT.

The text of the manual includes all of the standards associated with the maritime industry. Please note, however, that the maritime industry is also subject to the regulations contained in 29 CFR part 1910, general industry standards which are included in Volume I of this service. The standards are divided by part and subpart; each subpart is preceded by a list of sections contained therein. Parts and subparts covered in this manual are as follows:

29CFR1915, Safety and Health Regulations for Shipyard Employment, subparts A thru L, and 29CFR1918, Safety and Health Regulations for Longshoring, subparts A thru J.

The format of the text is changed from that of the Federal Register to enhance reader useability. The following are some of the features employed as reader aids:

Features

- Two column, large type;
- Section numbers, part numbers and titles are large, boldface, across page;
- Paragraphs (number and side heads) are bold face;
- Subordinate paragraphs are indented;
- Paragraphs are separated by space;
- Page content indexes—first and last paragraph contained on page are indented top and bottom corner of outer edge.

3. APPENDICES

Appendices included in this manual are as follows: Appendix A, Subject Index; Appendix B, Contents of all Volumes; Appendix C, Interpretations.

a. Appendix A, Subject Index

1. Lists key words alphabetically
2. References section and paragraph number

b. Appendix B, Contents of all Volumes

Lists the contents for the other five volumes of the subscription service by major parts, subparts, and subject matter for easy reference to related information.

c. Appendix C, Interpretations

Interpretations are issued to clarify the intent of ambigious statements made in the standards. Appendix C contains all such active interpretations. Interpretations are assigned sequential numbers (OSHA Instruction Numbers). They appear in this order in the appendix. The heading of each interpretation identifies the instruction number and date. The subject section and paragraph number being interpreted are in bold face type following the heading. The standard being interpreted is identified by an INTERP symbol in the text of the standard. The INTERP symbol indicates a reference to this appendix.

To locate a specific interpretation quickly, a table of intepretations preceeds the body of Appendix C. The first column of the table lists, in numerical order, the section and paragraph number of the standard being interpreted. The second column identifies the OSHA Instruction number of the interpretation. The third column indicates the page number in the index where the interpretation is located.

Changes and Additions

This Manual is updated, as required, to incorporate current, complete, and accurate information for the Maritime Standards. It, therefore, provides the subscribers with the current status of these Standards. Changes and/or additions to the standards appearing in the Federal Register are published as change pages to this volume. Although the format of this manual differs, the text of the change is identical to that of the Federal Register.

All changes and additions should be recorded on the "Record of Changes/Additions" sheet located in the front of this volume. The Change Number and Date of Change/Addition will be taken from the Change Transmittal Sheet which will accompany all such changes and additions. The person inserting the change or addition will record the date he makes the change and his signature.

Changes on each page will be identified by a vertical bar along the outer margin of the text, tabulation, or illustration affected. The change number of the revision will be shown at the bottom of that page.

PART 1915—SHIPYARD EMPLOYMENT

OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR SHIPYARD EMPLOYMENT

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1915.2 Scope and application.
1915.3 Responsibility.
1915.4 Definitions.
1915.5 Reference specifications, standards and codes.
1915.6 Commercial diving operations.
1915.7 Competent person.

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1915.11 Scope and application of subpart.
1915.12 Precautions before entering.
1915.13 Cleaning and other cold work.
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1915.15 Maintaining gas-free conditions.
1915.16 Warning signs.

SUBPART C—SURFACE PREPARATION AND PRESERVATION

1915.31 Scope and application of subpart.
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1915.33 Chemical paint and preservative removers.
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SUBPART D—WELDING, CUTTING AND HEATING

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1915.53 Welding, cutting and heating in way of preservative coatings.
1915.54 Welding, cutting and heating of hollow metal containers and structures not covered by § 1915.12.
1915.55 Gas welding and cutting.
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1915.57 Uses of fissionable material in ship repairing and shipbuilding.

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

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1915.72 Ladders.
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1915.74 Access to vessels.
1915.75 Access to and guarding of dry docks and marine railways.
1915.76 Access to cargo spaces and confined spaces.
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1915.95 Ship repairing and shipbuilding work on or in the vicinity of radar and radio.
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1915.133 Hand tools.
1915.134 Abrasive wheels.
1915.135 Power actuated fastening tools.
1915.136 Internal combustion engines other than ship's equipment.

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1915.151 Eye protection.
1915.152 Respiratory protection.
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1915.154 Lifesaving equipment.

SUBPART J—SHIP'S MACHINERY AND PIPING SYSTEMS

1915.161 Scope and application of subpart.
1915.162 Ship's boilers.
1915.163 Ship's piping systems.
1915.164 Ship's propulsion machinery.
1915.165 Ship's deck machinery.

SUBPART K—PORTABLE, UNFIRED PRESSURE VESSELS, DRUMS AND CONTAINERS, OTHER THAN SHIP'S EQUIPMENT

1915.171 Scope and application of subpart.
1915.172 Portable air receivers and other unfired pressure vessels.
1915.173 Drums and containers.

SUBPART L—ELECTRICAL MACHINERY

1915.181 Electrical circuits and distribution boards.

AUTHORITY: Sec. 41, 44 Stat. 1444; sec. 1, 72 Stat. 835; 33 U.S.C. 941; secs. 6 and 8, 84 Stat. 1593, 1599, 1600; 29 U.S.C. 655, 657.

SOURCE: The provisions of this part 1915 appear at 47 F.R. 16984, April 20, 1982, unless otherwise noted.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART A—GENERAL PROVISIONS

1915.1 Purpose and authority.
1915.2 Scope and application.
1915.3 Responsibility.
1915.4 Definitions.
1915.5 Reference specifications, standards and codes.
1915.6 Commercial diving operations.
1915.7 Competent person.

SUBPART A—GENERAL PROVISIONS

1915.1—PURPOSE AND AUTHORITY

The provisions in this part constitute safety and health regulations issued by the Secretary pursuant to section 41 of the Longshoremen's and Harbor Workers' Compensation Act, as amended (33 U.S.C. 941) and occupational safety and health standards issued by the Secretary pursuant to section 6 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655).

1915.2—SCOPE AND APPLICATION

(a) Except where otherwise provided, the provisions of this part shall apply to all ship repairing, shipbuilding and shipbreaking employments and related employments.

(b) This part does not apply to matters under the control of the United States Coast Guard within the scope of Title 52 of the Revised Statutes and acts supplementary or amendatory thereto (46 U.S.C. secs. 1–1388 passim) including, but not restricted to, the master, ship's officer, crew members, design, construction and maintenance of the vessel, its gear and equipment; to matters within the regulatory authority of the United States Coast Guard to safeguard vessels, harbors, ports and waterfront facilities under the provisions of the Espionage Act of June 17, 1917, as amended (50 U.S.C. 191 et seq.; 22 U.S.C. 401 et seq.); including the provisions of Executive Order 10173, as amended by Executive Orders 10277 and 10352 (3 CFR, 1949–1953 Comp., pp. 356, 778 and 873); or to matters within the regulatory authority of the United States Coast Guard with respect to lights, warning devices, safety equipment and other matters relating to the promotion of safety of lives and property under section 4(e) of the Outer Continental Shelf Lands Act (43 U.S.C. 1333).

1915.3—RESPONSIBILITY

(a) The responsibility for compliance with the regulations of this part is placed upon "employers" as defined in § 1915.4.

(b) This part does not apply to owners, operators, agents or masters of vessels unless such persons are acting as "employers." However, this part is not intended to relieve owners, operators, agents or masters of vessels who are not "employers" from responsibilities or duties now placed upon them by law, regulation or custom.

(c) The responsibilities placed upon the competent person herein shall be deemed to be the responsibilities of the employer.

1915.4—DEFINITIONS

(a) The term "shall" indicates provisions which are mandatory.

(b) The term "Secretary" means the Secretary of Labor.

(c) The term "employer" means an employer, any of whose employees are employed, in whole or in part, in ship repairing, shipbuilding, shipbreaking or related employments as defined in this section on the navigable waters of the United States, including dry docks, graving docks and marine railways.

(d) The term "employee" means any person engaged in ship repairing, shipbuilding, shipbreaking or related employments on the navigable waters of the United States, including dry docks, graving docks and marine railways, other than the master, ship's officers, crew of the vessel, or any person engaged by the master to repair any vessel under 18 net tons.

(e) The term "gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel including accommodation ladders, gangplanks and brows.

(f) The term "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, including special purpose floating structures not primarily designed for or used as a means of transportation on water.

(g) For purposes of § 1915.74, the term "barge" means an unpowered, flat bottom, shallow draft vessel including scows, carfloats and lighters. For purposes of this section, the term does not include ship shaped or deep draft barges.

(h) For purposes of § 1915.74, the term "river tow boat" means a shallow draft, low free board, self-propelled vessel designed to tow river barges by pushing ahead. For purposes of this section, the term does not include other towing vessels.

(i) The term "shipyard employment" means ship repairing, shipbuilding, shipbreaking and related employments.

(j) The terms "ship repair" and "ship repairing" mean any repair of a vessel including, but not restricted to, alterations, conversions, installations, cleaning, painting, and maintenance work.

(k) The term "shipbuilding" means the construction of a vessel including the installation of machinery and equipment.

(l) The term "shipbreaking" means any breaking down of a vessel's structure for the purpose of scrapping the vessel, including the removal of gear, equipment or any component part of a vessel.

(m) The term "related employment" means any employment performed as an incident to or in conjunction with ship repairing, shipbuilding or shipbreaking work, including, but not restricted to, inspection, testing, and employment as a watchman.

(n) The term "hazardous substance" means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

(o) The term "competent person" for purposes of this part means a person who is capable of recognizing and evaluating employee exposure to hazardous substances or to other unsafe conditions and is capable of specifying the necessary protection and precautions to be taken to ensure the safety of employees as required by the particular regulation under the condition to which it applies. For the purposes of Subparts B, C, and D of this part, except for § 1915.35(b)(8) and § 1915.36(a)(5), to which the above definition applies, the competent person must also meet the additional requirements of § 1915.7.

(p) The term "confined space" means a compartment of small size and limited access such as a double bottom tank, cofferdam, or other space which by its small size and confined nature can readily create or aggravate a hazardous exposure.

(q) The term "enclosed space" means any space, other than a confined space, which is enclosed by bulkheads and overhead. It includes cargo holds, tanks, quarters, and machinery and boiler spaces.

(r) The term "hot work" means riveting, welding, burning or other fire or spark producing operations.

(s) The term "cold work" means any work which does not involve riveting, welding, burning or other fire or spark producing operations.

(t) The term "portable unfired pressure vessel" means any pressure container or vessel used aboard ship, other than the ship's equipment, containing liquids or gases under pressure, excepting pressure vessels built to ICC regulations under 49 CFR Part 178, Subparts C and H.

(u) The term "powder actuated fastening tool" means a tool or machine which drives a stud, pin, or fastener by means of an explosive charge.

(v) For purposes of § 1915.97, the term "hazardous material" means a material which has one or more of the following characteristics: (1) Has a flash point below 140°F., closed cup, or is subject to spontaneous heating; (2) has a threshold limit value below 500 p.p.m. in the case of a gas or vapor, below 500 mg./m.^{3} for fumes, and below 25 m.p.p.c.f. in case of a dust; (3) has a single dose oral LD_{50} below 500 mg./kg.; (4) is subject to polymerization with the release of large amounts of energy; (5) is a strong oxidizing or reducing agent; (6) causes first degree burns to skin in short time exposure, or is systemically toxic by skin contact; or (7) in the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes which have one or more of the above characteristics.

1915.5—REFERENCE SPECIFICATIONS, STANDARDS AND CODES

Specifications, standards, and codes of agencies of the U.S. Government, to the extent specified in the text, form a part of the regulations of this part. In addition, under the authority vested in the Secretary under the Act, the specifications, standards, and codes of organizations which are not agencies of the U.S. Government, in effect on the date of the promulgation of the regulations of this part as listed below, to the extent specified in the text, form a part of the regulations of this part.

National Fire Protection Association, 60 Batterymarch Park, Quincy, Massachusetts 02269. Subpart B, § 1915.14(a).

Underwriter's Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611, Subpart B, § 1915.13(b) and (f); Subpart C, §§ 1915.35(b)(7), 1915.36(a)(4); Subpart H, § 1915.132(a).

American National Standards Institute Safety Code for Portable Metal Ladders, A14.2–1956, American National Standards Institute, 10 East 40th Street, New York, New York 10016, Subpart E. § 1915.72(a)(4).

American National Standards Institute Safety Code for Portable Wood Ladders, A14.1–1959, American National Standards Institute, 10 East 40th Street, New York, New York 10016, Subpart E. § 1915.72(a)(6).

American National Standards Institute Safety Code for Head, Eye, and Respiratory Protection, Z2.1–1959, American National Standards Institute, 10 East 40th Street, New York, New York 10016, Subpart I, §§ 1915.151(a)(1). 1915.153(b).

American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, 1963, American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017, Subpart K, § 1915.172(a).

Threshold Limit Values, 1970, American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202, Subpart B, § 1915.12(a)(3) and (b)(3); Subpart C, § 1915.32(b).

American National Standards Institute Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1–1964, United States of America Standards Institute, Inc., 10 East 40th Street, New York, New York 10016, Subpart H, § 1915.134(c).

1915.6—COMMERCIAL DIVING OPERATIONS

Commercial diving operations shall be subject to Subpart T of Part 1910, §§ 1910.401–1910.441 of this chapter.

1915.7—COMPETENT PERSON

(a) Designation.

(1) For the purposes of Subparts B, C, D, and H of this part, except for §§ 1915.35(b)(8) and 1915.36(a)(5), one or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section unless the requirements of Subparts B, C, D, and H of this part are always carried out by a National Fire Protection Association Certified Marine Chemist.

(2) The employer shall indicate on U.S. Department of Labor Form OSHA 73 "Designation of Competent Person" either those employees designated as competent persons or that the prescribed functions of such persons are always carried out by a National Fire Protection Association Certified Marine Chemist in addition to his professional duties. When additions or changes are made in the personnel so designated, a new Form OSHA 73 shall be executed. A copy of this executed form shall be forwarded to the nearest Area Office of the Occupational Safety and Health Administration.

(b) Criteria. The following criteria shall guide the employer in designating employees as competent persons:

(1) Ability to understand the meaning of designations on certificates and of any qualifications relating thereto and to carry out any instructions, either written or oral, left by the National Fire Protection Association Certified Marine Chemist or person authorized by the U.S. Coast Guard referred to in § 1915.14.

(2) Ability to use and interpret the readings of an oxygen indicator and a combustible gas indicator. The ability to use and interpret the readings of a carbon monoxide indicator and a carbon dioxide indicator, if the operations involved such hazardous gases.

(3) Familiarity with and understanding of Subparts B, C, D, and H of this part.

(4) Familiarity with the structure and knowledge of the location and designation of spaces of the types of vessels on which repair work is done.

(5) Capability to perform the tests and inspections required by Subparts B, C, D, and H of this part and to write the required logs.

(c) Logging of inspections and tests.

(1) When tests and inspections required to be performed by a competent person by any provisions of Subparts B, C, D, and H of this part, except those referred to in §§ 1915.35(b)(8) and 1915.36(a)(5) are made, a record of the locations, operations performed and date, time, and results of the tests and any instructions resulting therefrom shall be recorded on U.S. Department of Labor Form OSHA 74, "Log of Inspections and Tests by Competent Person." A separate form shall be used for each vessel on which tests and inspections are made.

(2) This record shall be available for inspection in the immediate vicinity of the affected operations while they are in progress. This record or copy thereof shall be kept on file for a period of at least three months from the date of the completion of the job.

(3) A copy of any certificate issued in accordance with § 1915.14 and of any instructions issued by the National Fire Protection Association Certified Marine Chemist shall be kept on file with the log for a period of at least three months from the date of the completion of the job. The certificate and instructions issued by the person doing the fumigation referred to in § 1915.12(b)(1)(ii) shall also be kept on file for a period of at least 3 months from the date of the completion of the job.

(d) Application. The provisions of this section are intended to apply in their entirety to employers engaged in general ship repair, shipbuilding and shipbreaking. They do not apply in their entirety to employers whose work involves only certain portions of Subparts B, C, or D of this part, such as repair work on small craft in boat yards where only combustible gas indicator tests are necessary for fuel tank leaks or when using flammable paints below decks, the building of some wooden vessels where only knowledge of the precautions to be taken when using flammable paints is necessary and the breaking of vessels with no exposure to fuel oil or other flammable hazards. In such cases, employers may designate persons who are competent on the basis of the applicable portions of the criteria set forth in paragraph (b) of this section.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1915.11	Scope and application of subpart.
1915.12	Precautions before entering.
1915.13	Cleaning and other cold work.
1915.14	Certification before hot work is begun.
1915.15	Maintaining gas-free conditions.
1915.16	Warning signs.

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1915.11—SCOPE AND APPLICATION OF SUBPART

Sections 1915.12 through 1915.15 of this subpart shall apply to ship repairing and shipbreaking and shall not apply to shipbuilding. Section 1915.16 shall apply only to ship repairing.

1915.12—PRECAUTIONS BEFORE ENTERING

(a) Flammable atmospheres and residues.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in paragraphs (a)(1)(i) and (ii) of this section, the atmosphere within the space to be entered shall be tested by a competent person to determine the concentration of flammable vapors or gases within the space.

(i) Cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk.

(ii) Spaces immediately adjacent to those described in paragraph (a)(1)(i) of this section.

(2) If the tests indicate that the atmosphere in the space to be entered contains a concentration of flammable vapor or gas greater than 10 percent of the lower explosive limit, the space shall be ventilated to reduce the concentration below 10 percent of the lower explosive limit before men are permitted to enter.

(3) If the atmosphere in the space to be entered is found to contain a concentration of flammable vapor or gas below the level immediately dangerous to life as defined in § 1915.152(b)(1), but above the threshold limit value, employees shall be protected in accordance with the requirements of § 1915.152(a), and (c), (d), or (e), whichever is applicable.

(b) Toxic atmospheres and residues.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in paragraphs (b)(1)(i), (ii), and (iii) of this section, the atmosphere in the space to be entered shall be tested for toxic atmospheric contaminants, and the space inspected for the presence of toxic or corrosive residues by a Marine Chemist, Industrial Hygienist or other person qualified to make these tests and inspections.

(i) Cargo spaces or other spaces containing or having last contained bulk liquids, gases, or solids of a toxic, corrosive, or irritant nature.

(ii) Spaces which have been fumigated.

(iii) Spaces immediately adjacent to those described in paragraphs (b)(1)(i) and (ii) of this section.

(2) If the tests indicate that the atmosphere in the space to be entered contains a concentration of toxic contaminants above the level which is immediately dangerous to life, the space shall be ventilated to reduce the concentration below the level immediately dangerous to life as defined in § 1915.152(b)(1).

(3) If the atmosphere in the space to be entered is found to contain a concentration of toxic contaminants below the level immediately dangerous to life as defined in § 1915.152(b)(1), but above the threshold limit value, employees shall be protected in accordance with the requirements of § 1915.152(a), and (c), (d), or (e), whichever is applicable.

(4) The person qualified to make the tests and inspections referred to in paragraph (b)(1) of this section shall make a record of the tests, inspections and instructions pertaining to paragraph (a)(3) of this section and paragraphs (b)(2) and (b)(3) of this section on U.S. Department of Labor Form OSHA 74, which shall be available for inspection and kept on file in accordance with § 1915.7(c)(2).

(c) Oxygen deficient atmospheres.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in paragraphs (c)(1)(i) through (v) of this section, the atmosphere in the spaces to be entered shall be tested by a competent person with an oxygen indicator or other suitable device to ensure that it contains at least 16.5 percent oxygen.

(i) Spaces in which the test required by paragraphs (a) and (b) of this section indicate that no flammable or toxic contaminants are present in the atmosphere.

(ii) Compartments which have been sealed.

(iii) Spaces which have been coated and closed up.

(iv) Nonventilated compartments which have been freshly painted.

(v) Cargo spaces containing cargoes or residues of cargoes which absorb oxygen, such as scrap iron, fresh fruit and molasses, and various vegetable drying oils in bulk.

(2) If the tests indicate that the atmosphere in the space to be entered contains less than 16.5 percent oxygen, the space shall be ventilated until tests indicate an oxygen content above this level.

(d) Exceptions. In emergencies and in cases of work of brief duration necessary to accomplish the ventilation required or to start operations, work may be performed in atmospheres containing concentrations of flammable contaminants above the upper explosive limit or otherwise immediately dangerous to life, provided employees are protected in accordance with the requirements of § 1915.152 (a) and (b).

1915.13—CLEANING AND OTHER COLD WORK

(a) Employees shall be permitted to perform manual cleaning to remove residue materials, scale, and debris or to perform other cold work in spaces described in § 1915.12(a)(1) (i) and (ii) and (b)(1)(i) through (iii) before they have been certified as gas free only under the following conditions:

(1) Liquid residues of flammable and toxic materials shall be removed from the spaces as thoroughly as practicable before employees start actual cleaning operations in these spaces. Drippings and spills of these materials on deck or elsewhere alongside the vessel shall be cleaned up as the work progresses. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel.

(2) Continuous natural or mechanical ventilation shall be provided to keep the concentration of flammable vapors below ten (10) percent of the lower explosive limit in all parts of the space: *Provided*, That if, because of the high volatility of the residues, a uniform concentration of less than ten (10) percent of the lower explosive limit cannot be achieved, sufficient exhaust ventilation shall be provided to reduce the concentration to or below that level in the major portions of the compartment.

(3) Tests shall be made by a competent person prior to commencement of cold work and with sufficient frequency thereafter, in accordance with temperature, volatility of the residues and other existing conditions in and about the spaces, to ensure that the concentration stated in paragraph (a)(2) of this section is not exceeded.

(4) Cold work only shall be permitted.

(5) Tests shall be made by a competent person to ensure that the exhaust vapors from these spaces are not accumulating in other areas within or around the vessel, marine railway, drydock, graving dock, or under the pier where sources of ignition may be present. Should such accumulations be found, any sources of ignition within the affected area shall be removed or extinguished.

(b) Only approved explosion-proof, self-contained, battery-fed, portable lamps shall be used in spaces described in paragraph (a) of § 1915.14 before the spaces have been certified as "Safe for Men." Battery-fed, portable lamps bearing the approval of the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the Mine Safety and Health Administration, and such lamps listed by the U.S. Coast Guard as approved for such use are deemed to meet the requirements of this paragraph.

(c) Signs shall be posted on the open deck adjacent to the access to spaces described in paragraph (a) of § 1915.14 prohibiting smoking and the use of open flames.

(d) The metallic parts of air moving devices, including fans, blowers, and jet-type air movers, and all duct work shall be electrically bonded to the vessel's structure.

(e) All motors and control equipment shall be of the explosion-proof type. Fans shall have nonferrous blades. Portable air ducts shall also be of nonferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(f) In spaces described in paragraph (a) of § 1915.14 which have been certified "Safe for Men," either battery lamps or explosion-proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the Mine Safety and Health Administration or the U.S. Coast Guard, shall be used: *Provided*, The lights are mounted to the space openings from the exterior, or suspended within the space with the cables so led as to protect them from injury.

(g) In spaces certified "Safe for Fire" nonexplosion proof lights may be used.

1915.14—CERTIFICATION BEFORE HOT WORK IS BEGUN

Paragraphs (a) through (c) of this section apply to ship repairing and shipbreaking. Paragraph (d) of this section applies to shipbreaking only.

(a) Employees shall not be permitted to engage in hot work or the use of powder actuated fastening tools in or on the following spaces, boundaries or pipe lines until a certificate setting forth that the hot work can be done in safety is issued. Such certificate shall be acceptable only if issued by a Marine Chemist certificated by the National Fire Protection Association, except that a certificate issued by another person authorized by the U.S. Coast Guard pursuant to the provisions of 46 CFR 35.01–1(c)(1) for tank vessels, 46 CFR 71.60–1(c)(1) for passenger vessels, and 46 CFR 91.50–1(c)(1) for cargo and miscellaneous vessels is acceptable for a particular inspection:

(1) On tank vessels.

(i) Within or on the boundaries of cargo tanks which have been used to carry combustible or flammable liquids and gases in bulk, or within spaces adjacent to such cargo tanks.

(ii) Within or on the boundaries of fuel tanks.

(iii) On pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(2) On dry cargo, miscellaneous and passenger vessels.

(i) Within or on the boundaries of cargo tanks which have been used to carry combustible or flammable liquids and gases in bulk.

(ii) Within spaces adjacent to cargo tanks which have been used to carry flammable gases, or liquids with a flash point below 150°F., except where the distance between such cargo tanks and the work to be performed is not less than twenty-five (25) feet.

(iii) Within or on the boundaries of fuel tanks.

(iv) On pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(b) In dry cargo holds for which a Marine Chemist's certificate is not required by paragraph (a)(2)(ii) of this section, hot work may be performed only after a competent person has carefully examined the hold and found it to be free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

(c) Before hot work is performed in engine room and boiler room spaces of any vessel for which a Marine Chemist's certificate is not required by the provision of paragraph (a) of this section or in fuel tank and engine compartments of boats, the bilges shall be inspected and tested by a competent person to ensure that they are free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

(d) Before hot work is performed from open decks or in tanks or compartments from which the overhead has been completely removed, on the boundaries of cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk, the following steps shall be taken:

(1) Tests shall be made by a competent person to determine the concentration of flammable vapors in these spaces. The permissible level of concentration of flammable vapors shall not exceed ten (10) percent of the lower explosive limint in all parts of the spaces.

(2) When the tests indicate that a space contains a concentration of flammable vapors above the permissible concentration, the space shall be inerted with a nonflammable gas or with water, or sufficient ventilation shall be provided to reduce the concentration below the permissible level.

(3) When the bottom of a space contains flammable residues, it shall be flooded with water to cover all parts of the space to a depth of at least one (1) foot unless the space is inerted.

1915.15—MAINTAINING GAS FREE CONDITIONS

Paragraph (a) of this section applies to ship repair only. Paragraph (b) of this section applies to shipbreaking only.

(a) Requirements applicable to ship repairing only.

(1) Pipe lines which may convey hazardous substances into the spaces certified "Safe For Men—Safe For Fire" shall be disconnected or blanked off, or other positive means shall be used to prevent discharge of hazardous substances from entering the space. Manholes and other closures which were secured when tests were made shall remain secured. If such manholes or other closures are opened or any manipulation of valves takes place which tends to alter existing conditions, work in the affected spaces or areas shall be stopped and not resumed until such times as the areas have been retested and again certified "Safe For Men—Safe For Fire" in accordance with the requirements of § 1915.14(a).

(2) Before hot work is commenced on the weather deck over spaces which, under these regulations, are not required to be gas freed or inerted, all valves, closures and vents, except those which are vented up masts, connecting with nongas free tanks or compartments below, shall be closed. Valves, closures and vents shall not be opened until hot work is completed unless the hot work is stopped and the work location posted as unsafe for fire. The latter notice shall not be removed nor hot work resumed until the area is again made safe.

(3) The employer shall inform masters and chief engineers of vessels of the provisions of this section and shall confirm that they are aware of their responsibilities for seeing that their crews understand and obey all warning signs, tags, and the limitations stated on the marine chemist's certificates.

(4) When conditions in a tank are such that there is a possibility of hazardous vapor being released from residues or other sources after a marine chemist's certificate has been issued, a competent person shall make tests to insure that the gas-free condition is maintained irrespective of whether hot work is being performed in the tank. When the competent person finds that atmospheric conditions have altered, work shall be stopped and a new marine chemist's certificate in accordance with the requirements of § 1915.14(a) shall be obtained before work is resumed.

(5) Before hot work is begun on any metal covered with preservative coatings, the requirements of § 1915.53 shall be met.

(b) Requirements applicable to shipbreaking only.

(1) During the performance of hot work from open decks or in tanks or compartments from which the overhead has been completely removed, on the boundaries of spaces described in § 1915.14(d), other than those filled with water, the competent person shall make frequent tests to ensure that the inert atmosphere is being maintained or that the concentration of flammable vapors remains below ten (10) percent of the lower explosive limit.

(2) When conditions in spaces below decks described in § 1915.14(a)(1) and (2) are such that there is a possibility of hazardous vapors being released from residues or other sources, after a Marine Chemist's certificate has been issued, a competent person shall make tests to ensure that the gas free condition is maintained irrespective of whether hot work is being performed in or on the aforementioned spaces. When the competent person finds that the atmospheric conditions have altered, work shall be stopped and a new Marine Chemist's certificate in accordance with § 1915.14(a)(1) and (2) shall be obtained, before work is resumed.

1915.16—WARNING SIGNS

The provisions of this section apply to ship repairing only.

(a) Except as provided in paragraph (c) of this section, all tanks, compartments, or spaces which have been certified "Safe For Men—Not Safe For Fire," or "Not Safe For Men—Not Safe For Fire" shall be plainly and conspicuously marked with paint or signs indicating that no hot work shall be performed on such tanks, compartments, or spaces or in the vicinity thereof.

(b) Except as provided in paragraph (c) of this section, all tanks, compartments or spaces which have been inerted with gas or certified "Not Safe For Men—Safe For Fire" shall be plainly and conspicuously marked with paint or signs indicating that the tank, compartment or space contains a gas which will not support life or is hazardous to employees.

(c) The warning marks or signs required by paragraphs (a) and (b) of this section need not be posted on individual tanks, compartments or spaces if the entire vessel has been certified "Safe For Men—Not Safe For Fire," "Not Safe For Men—Not Safe For Fire," or if the entire vessel has been inerted or certified "Not Safe For Men—Safe For Fire," and if a sign to this effect is conspicuously posted at the gangway and at all other means of access to the vessel.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART C—SURFACE PREPARATION AND PRESERVATION

1915.31 Scope and application of subpart.
1915.32 Toxic cleaning solvents.
1915.33 Chemical paint and preservative removers.
1915.34 Mechanical paint removers.
1915.35 Painting.
1915.36 Flammable liquids.

SUBPART C—SURFACE PREPARATION AND PRESERVATION

1915.31—SCOPE AND APPLICATION OF SUBPART

The standards contained in this subpart shall apply to ship repairing and shipbuilding and shall not apply to shipbreaking.

1915.32—TOXIC CLEANING SOLVENTS

(a) When toxic solvents are used, the employer shall employ one or more of the following measures to safeguard the health of employees exposed to these solvents.

(1) The cleaning operation shall be completely enclosed to prevent the escape of vapor into the working space.

(2) Either natural ventilation or mechanical exhaust ventilation shall be used to remove the vapor at the source and to dilute the concentration of vapors in the working space to a concentration which is safe for the entire work period.

(3) Employees shall be protected against toxic vapors by suitable respiratory protective equipment in accordance with the requirements of § 1915.152 (a) and (c), and, where necessary, against exposure of skin and eyes to contact with toxic solvents and their vapors by suitable clothing and equipment.

(b) The principles in the threshold limit values to which attention is directed in § 1915.4 will be used by the Department of Labor in enforcement proceedings in defining a safe concentration of air contaminants.

(c) When flammable solvents are used, precautions shall be taken in accordance with the requirements of § 1915.36.

1915.33—CHEMICAL PAINT AND PRESERVATIVE REMOVERS

(a) Employees shall be protected against skin contact during the handling and application of chemical paint and preservative removers and shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 1915.151 (a) and (b).

(b) When using flammable paint and preservative removers, precautions shall be taken in accordance with the requirements of § 1915.36.

(c) When using chemical paint and preservative removers which contain volatile and toxic solvents, such as benzol, acetone and amyl acetate, the provisions of § 1915.32 shall be applicable.

(d) When using paint and rust removers containing strong acids or alkalies, employees shall be protected by suitable face shields to prevent chemical burns on the face and neck.

(e) When steam guns are used, all employees working within range of the blast shall be protected by suitable face shields. Metal parts of the steam gun itself shall be insulated to protect the operator against heat burns.

1915.34—MECHANICAL PAINT REMOVERS

(a) Power tools.

(1) Employees engaged in the removal of paints, preservatives, rusts or other coatings by means of power tools shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 1915.151(a).

(2) All portable rotating tools used for the removal of paints, preservatives, rusts or other coatings shall be adequately guarded to protect both the operator and nearby workers from flying missiles.

(3) Portable electric tools shall be grounded in accordance with the requirements of § 1915.132.

(4) In a confined space, mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum shall be used, or employees shall be protected by respiratory protective equipment in accordance with the requirements of § 1915.152 (a) and (d).

(b) Flame removal.

(1) Hardened preservative coatings shall not be removed by flame in enclosed spaces unless the employees exposed to fumes are protected by air line respirators in accordance with the requirements of § 1915.152(a). Employees performing such an operation in the open air, and those exposed to the resulting fumes, shall be protected by a fume filter type respirator in accordance with requirements of paragraphs (a) and (d)(2)(iv) of § 1915.152.

(2) Flame or heat shall not be used to remove soft and greasy preservative coatings.

(c) Abrasive blasting.

(1) Equipment. Hoses and fittings used for abrasive blasting shall meet the following requirements:

(i) Hoses. Hose of a type to prevent shocks from static electricity shall be used.

(ii) Hose couplings. Hose lengths shall be joined by metal couplings secured to the outside of the hose to avoid erosion and weakening of the couplings.

(iii) Nozzles. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally.

(iv) Dead man control. A dead man control device shall be provided at the nozzle end of the blasting hose either to provide direct cutoff or to signal the pot tender by means of a visual and audible signal to cut off the flow, in the event the blaster loses control of the hose. The pot tender shall be available at all times to respond immediately to the signal.

(2) Replacement. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

(3) Personal protective equipment.

(i) Abrasive blasters working in enclosed spaces shall be protected by hoods and air fed respirators or by air helmets of a positive pressure type in accordance with the requirements of § 1915.152(a).

(ii) Abrasive blasters working in the open shall be protected as indicated in paragraph (c)(3)(i) of this section except that when synthetic abrasives containing less than one percent free silica are used jointly, filter type respirators approved jointly by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration for exposure to lead dusts may be used in accordance with § 1915.152(a) and (d).

(iii) Employees, other than blasters, including machine tenders and abrasive recovery men, working in areas where unsafe concentrations of abrasive materials and dusts are present shall be protected by eye and respiratory protective equipment in accordance with the requirements of §§ 1915.151(a) and (b) and 1915.152(a) and (d).

(iv) The blaster shall be protected against injury from exposure to the blast by appropriate protective clothing, including gloves.

(v) Since surges from drops in pressure in the hose line can be of sufficient proportions to throw the blaster off the staging, the blaster shall be protected by a safety belt when blasting is being done from elevations where adequate protection against falling cannot be provided by railings.

1915.35—PAINTING

(a) Paints mixed with toxic vehicles or solvents.

(1) When paints mixed with toxic vehicles or solvents are sprayed, the following conditions shall apply:

(i) In confined spaces, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of § 1915.152(a).

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of § 1915.152(a). Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of §§ 1915.152(a) and (e).

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of §§ 1915.152(a) and (e).

(2) Where brush application of paints with toxic solvents is done in confined spaces, or other areas where lack of ventilation creates a hazard, employees shall be protected by filter respirators in accordance with the requirements of §§ 1915.152(a) and (e).

(3) When flammable paints or vehicles are used, precautions shall be taken in accordance with the requirements of § 1915.36.

(4) The metallic parts of air moving devices, including fans, blowers, and jet-type air movers, and all duct work shall be electrically bonded to the vessel's structure.

(b) Paints and tank coatings dissolved in highly volatile, toxic and flammable solvents. Several organic coatings, adhesives and resins are dissolved in highly toxic, flammable and explosive solvents with flash points below 80°F. Work involving such materials shall be done only when all of the following special precautions have been taken:

(1) Sufficient exhaust ventilation shall be provided to keep the concentration of solvent vapors below ten (10) percent of the lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(2) If the ventilation fails or if the concentration of solvent vapors rises above ten (10) percent of the lower explosive limit painting shall be stopped and the compartment shall be evacuated until the concentration again falls below ten (10) percent of the lower explosive limit. If the concentration does not fall when painting is stopped, additional ventilation to bring the concentration down to ten (10) percent of the lower explosive limit shall be provided.

(3) Ventilation shall be continued after the completion of painting until the space or compartment is gas free. The final determination as to whether the space or compartment is gas free shall be made after the ventilating equipment has been shut off for at least 10 minutes.

(4) Exhaust ducts shall discharge clear of working areas and away from sources of possible ignition. Periodic tests shall be made to ensure that the exhuasted vapors are not accumulating in other areas within or around the vessel or dry dock.

(5) All motors and control equipment shall be of the explosion-proof type. Fans shall have nonferrous blades. Portable air ducts shall also be of nonferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(6) Only non-sparking paint buckets, spray guns and tools shall be used. Metal parts of paint brushes and rollers shall be insulated. Staging shall be erected in a manner which ensures that it is non-sparking.

(7) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the Mine Safety and Health Administration or the U.S. Coast Guard, shall be used.

(8) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty (50) feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(9) The face, eyes, head, hands, and all other exposed parts of the bodies of employees handling such highly volatile paints shall be protected. All footwear shall be non-sparking, such as rubbers, rubber boots or rubber soled shoes without nails. Coveralls or other outer clothing shall be of cotton. Rubber, rather than plastic, gloves shall be used because of the danger of static sparks.

(10) No matches, lighted cigarettes, cigars, or pipes, and no cigarette lighters or ferrous articles shall be taken into the area where work is being done.

(11) All solvent drums taken into the compartment shall be placed on nonferrous surfaces and shall be grounded to the vessel. Metallic contact shall be maintained between containers and drums when materials are being transferred from one to another.

(12) Spray guns, paint pots, and metallic parts of connecting tubing shall be electrically bonded, and the bonded assembly shall be grounded to the vessel.

(13) All employees continuously in a compartment in which such painting is being performed, shall be protected by air line respirators in accordance with the requirements of § 1915.152(a) and by suitable protective clothing. Employees entering such compartments for a limited time shall be protected by filter cartridge type respirators in accordance with the requirements of §§ 1915.152(a) and (e).

(14) All employees doing exterior paint spraying with such paints shall be protected by suitable filter cartridge type respirators in accordance with the requirements of §§ 1915.152(a) and (e) and by suitable protective clothing.

1915.36—FLAMMABLE LIQUIDS

(a) In all cases when liquid solvents, paint and preservative removers, paints or vehicles, other than those covered by § 1915.35(b), are capable of producing a flammable atmosphere under the conditions of use, the following precautions shall be taken:

(1) Smoking, open flames, arcs and spark-producing equipment shall be prohibited in the area.

(2) Ventilation shall be provided in sufficient quantities to keep the concentration of vapors below ten (10) percent of their lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(3) Scrapings and rags soaked with these materials shall be kept in a covered metal container.

(4) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the Mine Safety and Health Administration or the U.S. Coast Guard, shall be used.

(5) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty (50) feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(6) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART D—WELDING, CUTTING AND HEATING

1915.51 Ventilation and protection in welding, cutting and heating.
1915.52 Fire prevention.
1915.53 Welding, cutting and heating in way of preservative coatings.
1915.54 Welding, cutting and heating of hollow metal containers and structures not covered by § 1915.12.
1915.55 Gas welding and cutting.
1915.56 Arc welding and cutting.
1915.57 Uses of fissionable material in ship repairing and shipbuilding.

SUBPART D—WELDING, CUTTING AND HEATING

1915.51—VENTILATION AND PROTECTION IN WELDING, CUTTING AND HEATING

(a) The provisions of this section shall apply to all ship repairing, shipbuilding, and shipbreaking operations; except that paragraph (e) of this section shall apply only to ship repairing and shipbuilding. Paragraph (g) of this section shall apply only to ship repairing.

(b) Mechanical ventilation requirements.

(1) For purposes of this section, mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

(c) Welding, cutting and heating in confined spaces.

(1) Except as provided in paragraphs (c)(3) and (d)(2) of this section either general ventilation meeting the requirements of paragraph (b) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

(2) The means of access shall be provided to a confined space and ventilation ducts to this space shall be arranged in accordance with §§ 1915.76(b) (1) and (2).

(3) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of § 1915.152(a), and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(d) Welding, cutting or heating of metals of toxic significance.

(1) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified below shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section:

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals.

(iii) Cadmium-bearing filler materials.

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(2) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified below shall be performed with local exhaust ventilation in accordance with the requirements of paragraph (b) of this section or employees shall be protected by air line respirators in accordance with the requirements of § 1915.152(a):

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.

(ii) Cadmium-bearing or cadmium coated base metals.

(iii) Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(3) Employees performing such operations in the open air shall be protected by filter type respirators in accordance with the requirements of paragraphs (a) and (d)(2)(iv) of § 1915.152, except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of § 1915.152(a).

(4) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(e) Inert-gas metal-arc welding.

(1) Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken:

(i) The use of chlorinated solvents shall be kept at least two hundred (200) feet from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

(ii) Helpers and other employees in the area not protected from the arc by screening as provided in § 1915.56(e) shall be protected by filter lenses meeting the requirements of §§ 1915.151 (a) and (c). When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type meeting the requirements of §§ 1915.151 (a) and (c) shall be worn under welding helmets or hand shields to protect the welder against flashes and radiant energy when either the helmet is lifted or the shield is removed.

(iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

(iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of paragraph (d)(2) of this section shall be met to protect against dangerous concentrations of nitrogen dioxide.

(f) General welding, cutting, and heating.

(1) Welding, cutting and heating not involving conditions or materials described in paragraphs (c), (d) or (e) of this section may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

(2) Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of §§ 1915.151 (a) and (c).

(g) Residues and cargoes of metallic ores.

(1) Residues and cargoes of metallic ores of toxic significance shall be removed from the area or protected from the heat before ship repair work which involves welding, cutting or heating is begun.

1915.52—FIRE PREVENTION[1]

(a) Paragraph (a) applies to ship repairing, shipbuilding and shipbreaking, and paragraph (b) applies to ship repairing and shipbuilding only.

(1) When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards including residues of combustible bulk cargoes in the vicinity shall be taken to a safe place.

(2) If the object to be welded, cut or heated cannot be moved and if all the fire hazards including combustible cargoes cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

(3) When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat tranfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(4) In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch hour. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from confined spaces when they are disconnected from the torch or other gas consuming device.

(b) The provisions of this paragraph shall apply to ship repairing and shipbuilding only.

(1) No welding, cutting or heating shall be done where the application of flammable paints or the presence of other flammable compounds or of heavy dust concentrate creates a hazard.

(2) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. In addition, when hot work is being performed aboard a vessel and pressure is not available on the vessel's fire system, an auxiliary supply of water shall be made available where practicable, consistent with avoiding freezing of the lines or hose.

(3) When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed and for a sufficient period of time after completion of the work to insure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used.

(4) Vaporizing liquid extinguishers shall not be used in enclosed spaces.

(5) Except when the contents are being removed or transferred, drums, pails, and other containers which contain or have contained flammable liquids shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations, or open flames.

(c) In all cases, suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. Personnel assigned to contain fires within controllable limits shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used. The provisions of this paragraph shall apply to shipbreaking only.

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[1] 46 CFR 146.02-20 contains Coast Guard regulations pertaining to welding and cutting while explosives and dangerous cargoes are being handled.

1915.53—WELDING, CUTTING AND HEATING IN WAY OF PRESERVATIVE COATINGS

(a) The provisions in this section shall apply to all ship repairing, shipbuilding and shipbreaking operations except for paragraphs (e) and (f) of this section which shall apply to ship repairing and shipbuilding and shall not apply to shipbreaking.

(b) Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

(c) Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable they shall be stripped from the area to be heated to prevent ignition, or, where shipbreaking is involved, the coatings may be burned away under controlled conditions. A 1½ inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.

(d) Protection against toxic preservative coatings.

(1) In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application or the employees shall be protected by air line respirators meeting the requirements of § 1915.152(a).

(2) In the open air, employees shall be protected by a filter type respirator in accordance with the requirements of §§ 1915.152 (a) and (d).

(e) Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken:

(1) A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will ensure that the welding, cutting or heating can be performed in safety.

(2) The preservative coatings shall be removed for a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heated area may be used to limit the size of the area required to be cleaned. The prohibition contained in § 1915.34(b)(2) shall apply.

(f) Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapors are being produced by the coatings. If such vapors are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to ensure that the operation can be resumed safely.

1915.54—WELDING, CUTTING AND HEATING OF HOLLOW METAL CONTAINERS AND STRUCTURES NOT COVERED BY § 1915.12

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Drums, containers, or hollow structures which have contained flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

(b) Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

(c) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

(d) Objects such as those listed in paragraph (c) of this section shall also be inspected to determine whether water or other non-flammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

(e) Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure which may build up during the application of heat.

1915.55—GAS WELDING AND CUTTING

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Transporting, moving and storing compressed gas cylinders.

(1) Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.

(2) When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings.

(3) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

(4) When cylinders are transported by vehicle, they shall be secured in position.

(5) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(6) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(7) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

(8) When work is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valves shall be closed.

(9) Acetylene cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

(b) Placing cylinders.

(1) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(2) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(3) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

(4) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(c) Treatment of cylinders.

(1) Cylinders, whether full or empty, shall not be used as rollers or supports.

(2) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.

(3) No damaged or defective cylinder shall be used.

(d) Use of fuel gas. The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(1) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.

(2) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1½ turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(3) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(4) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(5) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.

(6) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

(e) Fuel gas and oxygen manifolds.

(1) Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(2) Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces.

(3) Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.

(4) When not in use, manifold and header hose connections shall be capped.

(5) Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

(f) Hose.

(1) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used.

(2) When parallel sections of oxygen and fuel gas hose are taped together not more than 4 inches out of 8 inches shall be covered by tape.

(3) All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service.

(4) Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used.

(5) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(6) Boxes used for the stowage of gas hose shall be ventilated.

(g) Torches.

(1) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose.

(2) Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

(3) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

(h) Pressure regulators. Oxygen and fuel gas pressure regulators including their related gauges shall be in proper working order while in use.

1915.56—ARC WELDING AND CUTTING

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Manual electrode holders.

(1) Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safety handling the maximum rated current required by the electrodes shall be used.

(2) Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

(b) Welding cables and connectors.

(1) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

(2) Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(3) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(4) Cables in poor repair shall not be used. When a cable other than the cable lead referred to in paragraph (b)(2) of this section becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

(c) Ground returns and machine grounding.

(1) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(2) Structures or pipe lines, except pipe lines containing gases of flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by paragraph (c)(1) of this section.

(3) When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.

(4) When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

(5) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(6) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(d) Operating instructions. Employers shall instruct employees in the safe means of arc welding and cutting as follows:

(1) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(2) Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.

(3) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.

(4) Any faulty or defective equipment shall be reported to the supervisor.

(e) Shielding. Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

1915.57—USES OF FISSIONABLE MATERIAL

The provisions of this section apply to ship repairing and shipbuilding only.

(a) In activities involving the use of and exposure to sources of ionizing radiation not only on conventionally powered but also on nuclear powered vessels, the applicable provisions of the Nuclear Regulatory Commission's Standards for Protection Against Radiation (10 CFR Part 20), relating to protection against occupational radiation exposure, shall apply.

(b) Any activity which involves the use of radioactive material, whether or not under license from the Nuclear Regulatory Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1915.71 Scaffolds or staging.
1915.72 Ladders.
1915.73 Guarding of deck openings and edges.
1915.74 Access to vessels.
1915.75 Access to and guarding of dry docks and marine railways.
1915.76 Access to cargo spaces and confined spaces.
1915.77 Working surfaces.

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1915.71—SCAFFOLDS OR STAGING

(a) Scope and application. The provisions of this section shall apply to all ship repairing, shipbuilding and shipbreaking operations except that paragraphs (b)(8) through (b)(10) and paragraphs (c) through (f) of this section shall only apply to ship repairing and shipbuilding operations and shall not apply to shipbreaking.

(b) General requirements.

(1) All scaffolds and their supports whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4).

(2) All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine, or short fiber lumber is prohibited.

(3) Lumber dimensions as given in this subpart are nominal except where given in fractions of an inch.

(4) All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.

(5) Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.

(6) Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms.

(7) No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

(8) No welding, burning, riveting or open flame work shall be performed on any staging suspended by means of fiber rope.

(9) Lifting bridles on working platforms suspended from cranes shall consist of four legs' so attached that the stability of the platform is assured.

(10) Unless the crane hook has a safety latch or is moused, the lifting bridles on working platforms suspended from cranes shall be attached by shackles to the lower lifting block or other positive means shall be taken to prevent them from becoming accidentally disengaged from the crane hook.

(c) Independent pole wood scaffolds.

(1) All pole uprights shall be set plump. Poles shall rest on a foundation of sufficient size and strength to distribute the load and to prevent displacement.

(2) In light-duty scaffolds, not more than 24 feet in height, poles may be spliced by overlapping the ends not less than 4 feet and securely nailing them together. A substantial cleat shall be nailed to the lower section to form a support for the upper section except when bolted connections are used.

(3) All other poles to be spliced shall be squared at the ends of each splice, abutted, and rigidly fastened together by not less than two cleats securely nailed or bolted thereto. Each cleat shall overlap each pole end by at least 24 inches and shall have a width equal to the face of the pole to which it is attached. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the pole.

(4) Ledgers shall extend over two consecutive pole spaces and shall overlap the poles at each end by not less than 4 inches. They shall be left in position to brace the poles as the platform is raised with the progress of the work. Ledgers shall be level and shall be securely nailed or bolted to each pole and shall be placed against the inside face of each pole.

(5) All bearers shall be set with their greater dimension vertical and shall extend beyond the ledgers upon which they rest.

(6) Diagnonal bracing shall be provided between the parallel poles, and cross bracing shall be provided between the inner and outer poles or from the outer poles to the ground.

(7) Minimum dimensions and spacing of members shall be in accordance with Table E-1 in § 1915.118.

(8) Platform planking shall be in accordance with the requirements of paragraph (i) of this section.

(9) Backrails and toeboards shall be in accordance with the requirements of paragraph (j) of this section.

(d) Independent pole metal scaffolds.

(1) Metal scaffold members shall be maintained in good repair and free of corrosion.

(2) All vertical and horizontal members shall be fastened together with a coupler or locking device which will form a positive connection. The locking device shall be of a type which has no loose parts.

(3) Posts shall be kept plumb during erection and the scaffold shall be subsequently kept plumb and rigid by means of adequate bracing.

(4) Posts shall be fitted with bases supported on a firm foundation to distribute the load. When wooden sills are used, the bases shall be fastened thereto.

(5) Bearers shall be located at each set of posts, at each level, and at each intermediate level where working platforms are installed.

(6) Tubular bracing shall be applied both lengthwise and crosswise as required.

(7) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(8) Backrails and toeboards shall be in accordance with the requirements of paragraph (j) of this section.

(e) Wood trestle and extension trestle ladders.

(1) The use of trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet is prohibited. The total height of base and extension may, however, be more than 20 feet.

(2) The minimum dimensions of the side rails of the trestle ladder, or the base sections of the extension trestle ladder, shall be as follows:

(i) Ladders up to and including those 16 feet long shall have side rails of not less than 1 5/16 × 2¾ inch lumber.

(ii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 1 5/16 × 3 inch lumber.

(3) The side rails of the extension section of the extension trestle ladder shall be parallel and shall have minimun dimensions as follows:

(i) Ladders up to and including 12 feet long shall have side rails of not less than 1 5/16 × 2¼ inch lumber.

(ii) Ladders over 12 feet long and up to and including those 16 feet long shall have side rails of not less than 1 5/16 × 2½ inch lumber.

(iii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 1 5/16 × 2¾ inch lumber.

(4) Trestle ladders and base sections of extension trestle ladders shall be so spread that when in an open position the spread of the trestle at the bottom, inside to inside, shall be not less than 5½ inches per foot of the length of the ladder.

(5) The width between the side rails at the bottom of the trestle ladder or of the base section of the extension trestle ladder shall be not less than 21 inches for all ladders and sections 6 feet or less in length. For longer lengths of ladder, the width shall be increased at least 1 inch for each additional foot of length. The width between the side rails of the extension section of the trestle ladder shall be not less than 12 inches.

(6) In order to limit spreading, the top ends of the side rails of both the trestle ladder and of the base section of the extension trestle ladder shall be beveled, or of equivalent construction, and shall be provided with a metal hinge.

(7) A metal spreader or locking device to hold the front and back sections in an open position, and to hold the extension section securely in the elevated position, shall be a component of each trestle ladder or extension ladder.

(8) Rungs shall be parallel and level. On the trestle ladder, or on the base section of the extension trestle ladder, rungs shall be spaced not less than 8 inches nor more than 18 inches apart; on the extension section of the extension trestle ladder, rungs shall be spaced not less than 6 inches nor more than 12 inches apart.

(9) Platform planking shall be in accordance with the requirements of paragraph (i) of this section, except that the width of the platform planking shall not exceed the distance between the siderails.

(10) Backrails and toeboards shall be in accordance with the requirements of paragraph (j) of this section.

(f) Painters' suspended scaffolds.

(1) The supporting hooks of swinging scaffolds shall be constructed to be equivalent in strength to mild steel or wrought iron, shall be forged with care, shall be not less than ⅞ inch in diameter, and shall be secured to a safe anchorage at all times.

(2) The ropes supporting a swinging scaffold shall be equivalent in strength to first-grade ¾ inch diameter manila rope properly rigged into a set of standard 6 inch blocks consisting of at least one double and one single block.

(3) Manila and wire ropes shall be carefully examined before each operation and thereafter as frequently as may be necessary to ensure their safe condition.

(4) Each end of the scaffold platform shall be supported by a wrought iron or mild steel stirrup or hanger, which in turn is supported by the suspension ropes.

(5) Stirrups shall be constructed so as to be equivalent in strength to wrought iron ¾ inch in diameter.

(6) The stirrups shall be formed with a horizontal bottom member to support the platform, shall be provided with means to support the guardrail and midrail and shall have a loop or eye at the top for securing the supporting hook on the block.

(7) Two or more swinging scaffolds shall not at any time be combined into one by bridging the distance between them with planks or any other form of platform.

(8) No more than two men shall be permitted to work at one time on a swinging scaffold built to the minimum specifications contained in this paragraph. Where heavier construction is used, the number of men permitted to work on the scaffold shall be determined by the size and the safe working load of the scaffold.

(9) Backrails and toeboards shall be in accordance with the requirements of paragraph (j) of this section.

(10) The swinging scaffold platform shall be one of the three types described in paragraphs (f) (11), (12), and (13) of this section.

(11) The ladder-type platform consists of boards upon a horizontal ladder-like structure, referred to herein as the ladder, the side rails of which are parallel. If this type of platform is used the following requirements shall be met.

(i) The width between the side rails shall be no more than 20 inches.

(ii) The side rails of ladders in ladder-type platforms shall be equivalent in strength to a beam of clear straight-grained spruce of the dimensions contained in Table E-2 in § 1915.118.

(iii) The side rails shall be tied together with the tie rods. The tie rods shall be not less than 5/16 inch in diameter, located no more than 5 feet apart, pass through the rails, and be riveted up tight against washers at both ends.

(iv) The rungs shall be of straight-grained oak, ash, or hickory, not less than 1⅛ inches diameter, with ⅞ inch tenons mortised into the side rails not less than ⅞ inch and shall be spaced no more than 18 inches on centers.

(v) Flooring strips shall be spaced no more than ⅝ inch apart except at the side rails, where 1 inch spacing is permissible.

(vi) Flooring strips shall be cleated on their undersides.

(12) The plank-type platform consists of planks supported on the stirrups or hangers. If this type of platform is used, the following requirements shall be met.

(i) The planks of plank-type platforms shall be of not less than 2 x 10 inch lumber.

(ii) The platform shall be no more than 24 inches in width.

(iii) The planks shall be tied together by cleats of not less than 1 x 6 inch lumber, nailed on their undersides at intervals of not more than 4 feet.

(iv) The planks shall extend not less than 6 inches nor more than 18 inches beyond the supporting stirrups.

(v) A cleat shall be nailed across the platform on the underside at each end outside the stirrup to prevent the platform from slipping off the strirrup.

(vi) Stirrup supports shall be not more than 10 feet apart.

(13) The beam-type platform consists of longitudinal side stringers with cross beams set on edge and spaced not more than 4 feet apart on which longitudinal platform planks are laid. If this type platform is used, the following requirements shall be met:

(i) The side stringers shall be of sound, straight-grained lumber, free from knots, and of not less than 2 x 6 inch lumber, set on edge.

(ii) The stringers shall be supported on the stirrups with a clear span between stirrups of not more than 16 feet.

(iii) The stringers shall be bolted to the stirrups by U-bolts passing around the stirrups and bolted through the stringers with nuts drawn up tight on the inside face.

(iv) The ends of the stringers shall extend beyond the stirrups not less than 6 inches nor more than 12 inches at each end of the platform.

(v) The platform shall be supported on cross beams of 2 x 6 inch lumber between the side stringers securely nailed thereto and spaced not more than 4 feet on centers.

(vi) The platform shall be not more than 24 inches wide.

(vii) The platform shall be formed of boards ⅞ inch in thickness by not less than 6 inches in width, nailed tightly together, and extending to the outside face of the stringers.

(viii) The ends of all platform boards shall rest on the top of the cross beams, shall be securely nailed, and at no intermediate points in the length of the platform shall there be any cantilever ends.

(g) Horse scaffolds.

(1) The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E–3 in § 1915.118.

(2) Horses constructed of materials other than lumber shall provide the strength, rigidity and security required of horses constructed of lumber.

(3) The lateral spread of the legs shall be equal to not less than one-third of the height of the horse.

(4) All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure.

(5) Platform planking shall be in accordance with the requirements of paragraph (i) of this section.

(6) Backrails and toeboards shall be in accordance with paragraph (j) of this section.

(h) Other types of scaffolds.

(1) Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of paragraphs (b), (i), and (j) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

(i) Scaffold or platform planking.

(1) Except as otherwise provided in paragraphs (f) (11) and (13) of this section, platform planking shall be of not less than 2 × 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

(2) Platforms of staging shall be not less then two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

(3) Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members.

(4) Table E–4 in § 1915.118 shall be used as a guide in determining safe loads for scaffold planks.

j. Backrails and toeboards.

(1) Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway.

(2) Rails shall be of 2 × 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 × 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fiber rope rails shall not be used.

(3) Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted, employees working more than 5 feet above solid surfaces shall be protected by safety belts and life lines meeting the requirements of § 1915.154(b), and employees working over water shall be protected by buoyant work vests meeting the requirements of § 1915.154(a).

(4) Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail.

(5) When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 × 4 inch lumber shall be provided.

(k) Access to staging.

(1) Access from below to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements of § 1915.72 or rigid type non-collapsible trestles with parallel and level rungs.

(2) Ramps and stairways shall be provided with 36-inch handrails with midrails.

(3) Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than one foot from the ladder to any intermediate landing or platform.

(4) Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

(5) Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements of § 1915.72 or a Jacob's ladder properly secured, meeting the requirements of § 1915.74(d).

1915.72—LADDERS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) General requirements.

(1) The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs.

(2) When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional arêa of the side rail. The dimensions of side rails for their total length shall be those specified in paragraphs (b) or (c) of this section.

(3) Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed.

(4) Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the American National Standards Institute Safety Code for Portable Metal Ladders, A14.2—1972.

(5) Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations.

(6) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the American National Standards Institute Safety Code for Portable Wood Ladders, A14—1975.

(b) Construction of portable wood cleated ladders up to 30 feet in length.

(1) Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low density woods is prohibited.

(2) Side rails shall be dressed on all sides and kept free of splinters.

(3) All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall not be more than ½ inch in diameter or within ½ inch of the edge of the rail or nearer than 3 inches to a tread or rung.

(4) Pitch pockets not exceeding 1/8 inch in width, 2 inches in length and ½ inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

(5) The width between side rails at the base shall be not less than 11½ inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least ¼ inch for each additional 2 feet in length.

(6) Side rails shall be at least 1⅝ × 3⅝ inches in cross section.

(7) Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails ½ inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

(8) Cleats 20 inches or less in length shall be at least 25/32 × 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least 25/32 × 3¾ inches in cross section.

(c) Construction of portable wood cleated ladders from 30 to 60 feet in length.

(1) Ladders from 30 to 60 feet in length shall be in accordance with the specifications of paragraph (b) of this section with the following exceptions:

(i) Rails shall be of not less than 2 × 6 inch lumber.

(ii) Cleats shall be of not less than 1 × 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fastenings of equivalent strength.

1915.73—GUARDING OF DECK OPENINGS AND EDGES

(a) The provisions of this section shall apply to ship repairing and shipbuilding operations and shall not apply to shipbreaking.

(b) When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings shall be suitably covered or guarded to a height of not less than 30 inches, except where the use of such guards is made impracticable by the work actually in progress.

(c) When employees are working around open hatches not protected by coamings to a height of 24 inches or around other large openings, the edge of the opening shall be guarded in the working area to height of 36 to 42 inches, except where the use of such guards is made inpracticable by the work actually in progress.

(d) When employees are exposed to unguarded edges of decks, platforms, flats, and similar flat surfaces, more than 5 feet above a solid surface, the edges shall be guarded by adequate guardrails meeting the requirements of § 1915.71(j)(1) and (2), unless the nature of the work in progress or the physical conditions prohibit the use or installation of such guardrails.

(e) When employees are working near the unguarded edges of decks of vessels afloat, they shall be protected by personal flotation devices, meeting the requirements of § 1915.154(a).

(f) Sections of bilges from which floor plates or gratings have been removed shall be guarded by guardrails except where they would interfere with work in progress. If these open sections are in a walkway at least two 10-inch planks placed side by side, or equivalent, shall be laid across the opening to provide a safe walking surface.

(g) Gratings, walkways, and catwalks, from which sections or ladders have been removed, shall be barricaded with adequate guardrails.

1915.74—ACCESS TO VESSELS

(a) Access to vessels afloat. The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(1) Whenever practicable, a gangway of not less than 20 inches walking surface of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of paragraphs (d) (1) and (2) of this section may be used.

(2) Each side of such gangway, and the turn table if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with a mid rail. Rails shall be of wood, pipe, chain, wire or rope and shall be kept taut at all times.

(3) Gangways on vessels inspected and certificated by the U.S. Coast Guard are deemed to meet the foregoing requirements, except in cases where the vessel's regular gangway is not being used.

(4) The gangway shall be kept properly trimmed at all times.

(5) When a fixed tread accommodations ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(6) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(7) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with midrails on both sides.

(8) Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(9) When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(10) Obstructions shall not be laid on or across the gangway.

(11) The means of access shall be adequately illuminated for its full length.

(12) Unless the construction of the vessel makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event loads shall not be passed over the means of access while employees are on it.

(b) Access to vessels in drydock or between vessels. Gangways meeting the requirements of paragraphs (a) (1), (2), (9), (10), (11) of this section shall be provided for access from wingwall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, from one vessel to another.

(c) Access to barges and river towboats.

(1) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained and properly secured.

(2) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of paragraph (a) (7) of this section shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping, shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder in accordance with the requirements of paragraph (d) of this section may be used.

(3) The means of access shall be in accordance with the requirements of paragraphs (a) (9), (10), and (11) of this section.

(d) Jacob's ladders.

(1) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(2) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

1915.75—ACCESS TO AND GUARDING OF DRY DOCKS AND MARINE RAILWAYS

The provisions of this section shall apply to ship reparing, shipbuilding and shipbreaking.

(a) A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead.

(b) Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a mid rail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope, and shall be kept taut at all times.

(c) Railings meeting the requirements of paragraph (b) of this section shall be provided on the means of access to and from the floors of graving docks.

(d) Railings approximately 42 inches in height, with a mid rail, shall be provided on the edges of wing walls of floating dry docks and on edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering or leaving the dock.

(e) When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42 inch railings with a mid rail. When such a railing would be impracticable or ineffective, other effective means shall be provided to prevent men from falling into the water.

(f) Access to wing walls from floors of dry docks shall be by ramps, permanent stairways or ladders meeting the applicable requirements of § 1915.72.

(g) Catwalks on stiles of marine railways shall be no less than 20 inches wide and shall have on at least one side a guardrail and midrail meeting the requirements of § 1915.71(j) (1) and (2).

1915.76—ACCESS TO CARGO SPACES AND CONFINED SPACES

The provisions of this section apply to ship repairing, shipbuilding and shipbreaking except that paragraph (a)(4) of this section applies to ship repairing only.

(a) Cargo spaces.

(1) There shall be at least one safe and accessible ladder in any cargo space which employees must enter.

(2) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(3) Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of paragraph (a) (1) of this section. When conditions are such that a straight ladder cannot be used, a Jacob's ladder meeting the requirements of § 1915.74 (d) may be used.

(4) When cargo is stowed within 4 inches of the back of ladder rungs, the ladder shall be deemed "unsafe" for the purpose of this section.

(5) Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that cargo drafts, equipment, materials, scrap or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or crane signalman of his intention.

(b) Confined spaces

(1) More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere in the space except where the structure or arrangement of the vessel makes this provision impractical.

(2) When the ventilation ducts required by these regulations must pass through these means of access, the ducts shall be of such a type and so arranged as to permit free passage of an employee through at least two of these means of access.

1915.77—WORKING SURFACES

(a) Paragraphs (b) through (d) of this section shall apply to ship repairing, shipbuilding operations and shall not apply to shipbreaking. Paragraph (e) of this section shall apply to shipbuilding, ship repairing and shipbreaking operations.

(b) When firebox floors present tripping hazards of exposed tubing or of missing or removed refractory, sufficient planking to afford safe footing shall be laid while work is being carried on within the boiler.

(c) When employees are working aloft, or elsewhere at elevations more than 5 feet above a solid surface, either scaffolds or a sloping ladder, meeting the requirements of this subpart, shall be used to afford safe footing, or the employees shall be protected by safety belts and lifelines meeting the requirements of § 1915.154(b). Employees visually restricted by blasting hoods, welding helmets, and burning goggles shall work from scaffolds, not from ladders, except for the initial and final welding or burning operation to start or complete a job, such as the erection and dismantling of hung scaffolding, or other similar, nonrepetitive jobs of brief duration.

(d) For work performed in restricted quarters, such as behind boilers and in between congested machinery units and piping, work platforms at least 20 inches wide meeting the requirements of § 1915.71(i)(1) shall be used. Backrails may be omitted if bulkheading, boilers, machinery units, or piping afford proper protection against falling.

(e) When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting the requirements of § 1915.154.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART F—GENERAL WORKING CONDITIONS

1915.91 Housekeeping.
1915.92 Illumination.
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SUBPART F—GENERAL WORKING CONDITIONS

1915.91—HOUSEKEEPING

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking except that paragraphs (c) and (e) of this section do not apply to shipbreaking.

(a) Good housekeeping conditions shall be maintained at all times. Adequate aisles and passageways shall be maintained in all work areas. All staging platforms, ramps, stairways, walkways, aisles, and passageways on vessels or dry docks shall be kept clear of all tools, materials, and equipment except that which is in use, and all debris such as welding rod tips, bolts, nuts, and similar material. Hose and electric conductors shall be elevated over or placed under the walkway or working surfaces or covered by adequate crossover planks.

(b) All working areas on or immediately surrounding vessels and dry docks, graving docks, or marine railways shall be kept reasonably free of debris, and construction material shall be so piled as not to present a hazard to employees.

(c) Slippery conditions on walkways or working surfaces shall be eliminated as they occur.

(d) Free access shall be maintained at all times to all exits and to all fire-alarm boxes or fire-extinguishing equipment.

(e) All oils, paints thinners, solvents, waste, rags, or other flammable substances shall be kept in fire resistant covered containers when not in use.

1915.92—ILLUMINATION

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) All means of access and walkways leading to working areas as well as the working areas themselves shall be adequately illuminated.

(b) Temporary lights shall meet the following requirements:

(1) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(2) Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Splices which have insulation equal to that of the cable are permitted.

(3) Cords shall be kept clear of working spaces and walkways or other locations in which they are readily exposed to damage.

(c) Exposed non-current-carrying metal parts of temporary lights furnished by the employer shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current. Grounding shall be in accordance with the requirements of § 1915.132 (b).

(d) Where temporary lighting from sources outside the vessel is the only means of illumination, portable emergency lighting equipment shall be available to provide illumination for safe movement of employees.

(e) Employees shall not be permitted to enter dark spaces without a suitable portable light. The use of matches and open flame lights is prohibited. In nongas free spaces, portable lights shall meet the requirements of § 1915.13.

(f) Temporary lighting stringers or streamers shall be so arranged as to avoid overloading of branch circuits. Each branch circuit shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

1915.93—UTILITIES

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking except that paragraph (c) of this section applies to ship repairing and shipbuilding only.

(a) Steam supply and hoses.

(1) Prior to supplying a vessel with steam from a source outside the vessel, the employer shall ascertain from responsible vessel's representatives, having knowledge of the condition of the plant, the safe working pressure of the vessel's steam system. The employer shall install a pressure gauge and a relief value of proper size and capacity at the point where the temporary steam hose joins the vessel's steam piping system or systems. The relief valve shall be set and capable of relieving at a pressure not exceeding the safe working pressure of the vessel's system in its present condition, and there shall be no means of isolating the relief valve from the system which it protects. The pressure gauge and relief valve shall be located so as to be visible and readily accessible.

(2) Steam hose and fittings shall have a safety factor of not less than five (5).

(3) When a steam hose is hung in a bight or bights, the weight shall be relieved by appropriate lines. The hose shall be protected against chafing.

(4) Steam hose shall be protected from damage and hose and temporary piping shall be so shielded where passing through normal work areas as to prevent accidental contact by employees.

(b) Electric power.

(1) When the vessel is supplied with electric power from a source outside the vessel, the following precautions shall be taken prior to energizing the vessel's circuits:

(i) If in dry dock, the vessel shall be adequately grounded.

(ii) The employer shall ascertain from responsible vessel's representatives, having knowledge of the condition of the vessel's electrical system, that all circuits to be energized are in a safe condition.

(iii) All circuits to be energized shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

(c) Infrared electrical heat lamps.

(1) All infrared electrical heat lamps shall be equipped with guards that surround the lamps with the exception of the face, to minimize accidental contact with the lamps.

1915.94—WORK IN CONFINED OR ISOLATED SPACES

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking. When any work is performed in a confined space, except as provided in § 1915–.51(c)(3), or when an employee is working alone in an isolated location, frequent checks shall be made to ensure the safety of the employees.

1915.95—WORK ON OR IN THE VICINITY OF RADAR AND RADIO

The provisions of this section shall apply to ship repairing and shipbuilding.

(a) No employees other than radar or radio repairmen shall be permitted to work on masts, king posts or other aloft areas unless the radar and radio are secured or otherwise made incapable of radiation. In either event, the radio and radar shall be appropriately tagged.

(b) Testing of radar or radio shall not be done until the employer can schedule such tests at a time when no work is in progress aloft or personnel can be cleared from the danger area according to minimum safe distances established for and based on the type, model, and power of the quipment.

1915.96—WORK IN OR ON LIFEBOATS

The provisions of this section shall apply to ship repairing, shipbuilding, and shipbreaking except that paragraph (b) of this section applies to ship repairing and shipbuilding only.

(a) Before employees are permitted to work in or on a lifeboat, either stowed or in a suspended position, the employer shall ensure that the boat is secured independently of the releasing gear to prevent the boat from falling due to accidental tripping of the releasing gear and movement of the davits or capsizing of a boat in chocks.

(b) Employees shall not be permitted to remain in boats while the boats are being hoisted into final stowed position.

(c) Employees shall not be permitted to work on the outboard side of lifeboats stowed on their chocks unless the boats are secured by gripes or otherwise secured to prevent them from swinging outboard.

1915.97—HEALTH AND SANITATION

The provisions of this section shall apply to ship repairing, shipbuilding, and shipbreaking except where indicated otherwise.

(a) No chemical product, such as a solvent or preservative; no structural material, such as cadmium or zinc coated steel, or plastic material; and no process material, such as welding filler metal; which is a hazardous material within the meaning of § 1915.3 (v), shall be used until the employer has ascertained the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling, application, or utilization of such a material.

(b) In order to ascertain the hazards, as required by paragraph (a) of this section, the employer shall obtain the following items of information which are applicable to a specific product or material to be used:

(1) The name, address, and telephone number of the source of the information specified in this paragraph, preferably those of the manufacturer of the product or material.

(2) The trade name and synonyms for a mixture of chemicals, a basic structural material, or for a process material; and the chemical name and synonyms, chemical family, and formula for a single chemical.

(3) Chemical names of hazardous ingredients, including, but not limited to, those in mixtures, such as those in : (i) Paints, preservatives, and solvents; (ii) alloys, metallic coatings, filler metals and their coatings or core fluxes; and (iii) other liquids, solids, or gases (e.g., abrasive materials).

(4) An indication of the percentage, by weight of volume, which each ingredient of a mixture bears to the whole mixture, and of the threshold limit value of each ingredient, in appropriate units.

(5) Physical data about a single chemical or mixture of chemicals, including boiling point, in degrees Fahrenheit; vapor pressure, in millimeters of mercury; vapor density of gas or vapor (air=1); solubility in water, in percent by weight; specific gravity of material (water=1); percent volatile, by volume, at 70° F.; evaporation rate for liquids (ether butyl acetate or ether may be taken as 1); and appearance and odor.

(6) Fire and explosion hazard data about a single chemical or a mixture of chemicals, including flash point, in degrees Fahrenheit; flammable limits, in percent by volume in air; suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information.

(7) Health hazard data, including threshold limit value, in appropriate units, for a single hazardous chemical or for the individual hazardous ingredients of a mixture, as appropriate; effects of overexposure; and emergency and first aid procedures.

(8) Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization.

(9) Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled.

(10) Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and of ventilation, such as local exhaust, general, special, or other types.

(11) Special precautionary information about handling and storing.

(12) Any other general precautionary information.

(c) The pertinent information required by paragraph (b) of this section shall be recorded either on U.S. Department of Labor Form OSHA 20, Material Safety Data Sheet, or on an essentially similar form which has been approved by the Occupational Safety and Health Administration. Copies of form OSHA 20 may be obtained at any of the following regional offices of the Occupational Safety and health Administration:

(1) Boston-Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont):

U.S. Department of Labor, OSHA, JFK Federal Building, Room 1804, Government Center, Boston, Massachusetts 02203

(2) New York City, Region II (New Jersey, New York and Puerto Rico):

U.S. Department of Labor, OSHA, 1515 Broadway (1 Astor Plaza), Room 3445, New York, New York 10036

(3) Philadelphia, Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia and West Virginia):

U.S. Department of Labor, OSHA, Gateway Building, Suite 2100, 3535 Market Street, Philadelphia, Pennsylvania 19104

(4) Atlanta, Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee):

U.S. Department of Labor, OSHA, 1375 Peachtree Street, N.E., Suite 587, Atlanta, Georgia 30309

(5) Chicago, Region V (Indiana, Illinois, Michigan, Minnesota, Ohio and Wisconsin):

U.S. Department of Labor, OSHA, 32nd Floor, Room 3263, 230 Dearborn Street, Chicago, Illinois 60604

(6) Dallas, Region VI (Arkansas, Louisiana, New Mexico, Oklahoma and Texas):

U.S. Department of Labor, OSHA, 555 Griffin Square Bldg., Room 602, Dallas, Texas 75202

(7) Kansas City, Region VII (Iowa, Kansas, Missouri and Nebraska):

U.S. Department of Labor, OSHA, 911 Walnut Street, Room 3000 Kansas City, Missouri 64106

(8) Denver, Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming):

U.S. Department of Labor, OSHA, Federal Building, Room 1554, 1961 Stout Street, Denver, Colorado 80294

(9) San Francisco, Region IX (American Samoa, Arizona, California, Guam, Hawaii, Nevada, Trust Territories of the Pacific Islands):

U.S. Department of Labor, OSHA, 9470 Federal Building, 450 Golden Gate Avenue, P.O. Box 36017, San Francisco, California 94102

(10) Seattle, Region X (Alaska, Idaho, Oregon and Washington):

U.S. Department of Labor, OSHA, Federal Office Building, Room 6048, 909 First Avenue, Seattle, Washington 98174

A completed form shall be preserved and available for inspection for a period of 3 months from the date of the completion of the job.

(d) The employer shall instruct employees who will be exposed to the hazardous materials as to the nature of the hazards and the means of avoiding them.

(e) The employer shall provide all necessary controls, and the employees shall be protected by suitable personal protective equipment against the hazards identified under paragraph (a) of this section and those hazards for which specific precautions are required in Subparts B, C, and D of this part.

(f) The employer shall provide adequate washing facilities for employees engaged in the application of paints or coatings or in other operations where contaminants can, by ingestion or absorption, be detrimental to the health of the employees. The employer shall encourage good personal hygiene practices by informing the employees of the need for removing surface contaminants by thorough washing of hands and face prior to eating or smoking.

(g) The employer shall not permit employees to eat or smoke in areas undergoing surface preparation or preservation or where shipbreaking operations produce atmospheric contaminants.

(h) The employer shall not permit employees engaged in ship repair work on a vessel to work in the immediate vicinity of uncovered garbage and shall ensure that employees working beneath or on the outboard side of a vessel are not subject to contamination by drainage or waste from overboard discharges.

(i) No minor under 18 years of age shall be employed in shipbreaking or related employments.

1915.98—FIRST AID

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Unless a first aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close at hand, shall be qualified to administer first aid to the injured.

(b) The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item. The contents of such kit shall contain a sufficient quantity of at least the following types of item:

Gauze roller bandages, 1 inch and 2 inch.

Gauze compress bandages, 4 inch.
Adhesive bandages, 1 inch.
Triangular bandage, 40 inch.
Ammonia inhalants and ampules.
Antiseptic applicators or swabs.
Burn dressing.
Eye dressing.
Wire or thin board splints.
Forceps and tourniquet.

(c) The contents of the first aid kit shall be checked before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

(d) There shall be available for each vessel on which ten (10) or more employees are working one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that no more than two strechers are required on each job location. A blanket or other liner suitable for transferring the patient to and from the stretcher shall be provided. Stretchers shall be kept close to the vessels. This paragraph does not apply where ambulance services which are available are known to carry such stretchers.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1915.111 Inspection.
1915.112 Ropes, chains and slings.
1915.113 Shackles and hooks.
1915.114 Chain falls and pull-lifts.
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1915.117 Qualifications of operators.
1915.118 Tables.

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1915.111—INSPECTION

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each shift and when necessary, at intervals during its use to ensure that it is safe. Defective gear shall be removed and repaired or replaced before further use.

(b) The safe working load of gear as specified in §§ 1915.112 and 1915.113 shall not be exceeded.

1915.112—ROPES, CHAINS AND SLINGS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Manila rope and manila rope slings.

(1) Table G-1 in § 1915.118 shall be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Wire rope and wire rope slings.

(1) Tables G-2 through G-5 in § 1915.118 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five (5) is maintained.

(2) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(3) Where U-bolt wire rope clips are used to form eyes, Table G-6 in § 1915.118 shall be used to determine the number and spacing of clips. The U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(4) Wire rope shall not be secured by knots.

(c) Chains and chain slings.

(1) Tables G-7 and G-8 in § 1915.118 shall be used to determine the working load limit of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products.

(2) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(3) Interlink wear, not accompanied by stretch in excess of 5 percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G–9 in § 1915.118 has been reached.

(4) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(5) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in paragraph (c)(4) of this section shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(6) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.

(7) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

1915.113—SHACKLES AND HOOKS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Shackles.

(1) Table G–10 in § 1915.118 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than (5) is maintained.

(b) Hooks.

(1) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(2) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(3) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

1915.114—CHAIN FALLS AND PULL-LIFTS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Chain falls and pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.

(b) Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.

(c) Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear. The upper hook shall be moused or otherwise secured against coming free of its support.

(d) Scaffolding shall not be used as a point of attachment for lifting devices such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

1915.115—HOISTING AND HAULING EQUIPMENT

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Derrick and crane certification:

(1) Derricks and cranes which are part of, or regularly placed aboard barges, other vessels, or on wingwalls of floating drydocks, and are used to transfer materials or equipment from or to a vessel or drydock, shall be tested and certificated in accordance with the standards provided in Part 1919 of this title by persons accredited for the purpose.

(b) The moving parts of hoisting and hauling equipment shall be guarded.

(c) Mobile crawler or truck cranes used on a vessel:

(1) The maximum manufacturer's rated safe working loads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers shall be conspicuously posted near the controls and shall be visible to the operator. A radius indicator shall be provided.

(2) The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.

(d) Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane whether permanently or temporarily mounted, shall be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

(e) Marine railways.

(1) The cradle or carriage on the marine railway shall be positively blocked or secured when in the hauled position to prevent it from being accidentally released.

1915.116—USE OF GEAR

(a) The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking except that paragraphs (c) and (d) of this section shall apply to ship repairing and shipbuilding only.

(b) Loads shall be safely rigged before being hoisted.

(c) Plates shall be handled on and off hulls by means of shackles whenever possible. Clips or pads of ample size shall be welded to the plate to receive the shackle pins when there are no holes in the plate. When it is not possible to make holes in or to weld pads to the plate, alligator tongs, grab clamps or screw clamps may be used. In such cases special precautions shall be taken to keep employees from under such lifts.

(d) Tag lines shall be provided on loads likely to swing or to need guidance.

(e) When slings are secured to eye-bolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.

(f) Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.

(g) Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.

(h) Loose ends of idle legs of slings in use shall be hung on the hook.

(i) Employees shall not be permitted to ride the hook or the load.

(j) Loads (tools, equipment or other materials) shall not be swung or suspended over the heads of employees.

(k) Pieces of equipment or structure susceptible to falling or dislodgement shall be secured or removed as early as possible.

(l) An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.

(m) Pallets, when used, shall be of such material and contruction and so maintained as to safely support and carry the loads being handled on them.

(n) A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, shall be completely opened. The beam or pontoon left in place adjacent to an opening shall be sufficiently lashed, locked or otherwise secured to prevent it from being unshipped so that it cannot be displaced by accident.

(o) Hatches shall not be open or closed while employees are in the square of the hatch below.

(p) Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning shall be given to employees in the vicinity of such operations.

(q) At no time shall an employee be permitted to place himself in a hazardous position between a swinging load and a fixed object.

1915.117—QUALIFICATIONS OF OPERATORS

Paragraphs (a) and (d) of this section shall apply to ship repairing and shipbuilding only. Paragraphs (b) and (c) of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.

(b) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

(c) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.

(d) No minor under eighteen (18) years of age shall be employed in occupations involving the operation of any power-driven hoisting apparatus or assisting in such operations by work such as hooking on, loading slings, rigging gear, etc.

1915.118—TABLES

The provisions of this section apply to ship repairing, shipbuilding and shipbreaking.

TABLE E-1.—DIMENSIONS AND SPACING OF WOOD INDEPENDENT-POLE SCAFFOLD MEMBERS

Structural members	Light duty (Up to 25 pounds per square foot)—Height in feet			Heavy duty (25 to 75 pounds per square foot)—Height in feet		
	24 or less	24–40	40–60	24 or less	24–40	40–60
Poles or uprights (in inches)	2 × 4	3 × 4 or 2 × 6	4 × 4	3 × 4	4 × 4	4 × 6
Bearers (in inches)	2 × 6	2 × 6	2 × 6	2 × 8	2 × 8	2 × 10
Ledgers (in inches)	2 × 6	2 × 6	2 × 6	2 × 8	2 × 8	2 × 8
Stringers (not supporting bearers) (in inches)	1 × 6	1 × 6	1 × 6	1 × 6	1 × 6	1 × 6
Braces (in inches)	1 × 4	1 × 6	1 × 6	1 × 6	1 × 6	1 × 6
Pole spacing—longitudinally (in feet)	7½	7½	7½	7	7	7
Pole spacing—transversely (in feet)	6½ min	7½ min	8½ min	6½	10	10
Ledger spacing—vertically (in feet)	7	7	7	4½	4½	4½

TABLE E-2.—SPECIFICATIONS FOR SIDE RAILS OF LADDERS

Length (in feet)	Cross section (in inches)	
	At ends	At center
15	1⅞ × 2¾	1⅞ × 3¾
16	1⅞ × 2¾	1⅞ × 3¾
18	1⅞ × 3	1⅞ × 4
20	1⅞ × 3	1⅞ × 4
24	1⅞ × 3	1⅞ × 4½

TABLE E-3.—SPECIFICATIONS FOR THE CONSTRUCTION OF HORSES

Structural members	Height in feet		
	Up to 10	10 to 16	16 to 20
	inches	*inches*	*inches*
Legs	2 × 4	3 × 4	4 × 6
Bearers or headers	2 × 6	2 × 8	4 × 6
Crossbraces	2 × 4 or 1 × 8	2 × 4	2 × 6
Longitudinal braces	2 × 4	2 × 6	2 × 6

TABLE E-4.—SAFE CENTER LOADS FOR SCAFFOLD PLANK OF 1,100 POUNDS FIBRE STRESS

Span in feet	Lumber dimensions in inches									
	A	B	A	B	A	B	A	B	A	B
	2 × 10	1⅝ × 9½	2 × 12	1⅝ × 11½	2 × 8	2⅝ × 7½	3 × 10	2⅝ × 9½	3 × 12	2⅝ × 11½
6	256		309		526		667		807	
8	192		232		395		500		605	
10	153		186		316		400		484	
12	128		155		263		333		404	
14	110		133		225		286		346	
16	......		116		197		250		303	

(A)—Rough lumber.
(B)—Dressed lumber.

TABLE G-1.—MANILA ROPE

[In pounds or tons of 2,000 pounds]

Circumferences	Diameter in inches	Single leg	60° bridle	45° bridle	30° bridle
		lbs.	lbs.	lbs.	lbs.
¾	¼	120	204	170	120
1	5/16	200	346	282	200
1⅛	⅜	270	467	380	270
1¼	7/16	350	605	493	350
1⅜	1 15/32	450	775	635	450
1½	½	530	915	798	530
1¾	9/16	690	1190	973	690
2	⅝	880	1520	1240	880
2¼	¾	1080	1870	1520	1080
2½	1 13/16	1300	2250	1830	1300
2¾	⅞	1540	2660	2170	1540
3	1	1800	3120	2540	1800
		Tons	Tons	Tons	Tons
3¼	1 1/16	1.0	1.7	1.4	1.0
3½	1⅛	1.2	2.1	1.7	1.2
3¾	1¼	1.35	2.3	1.9	1.35
4	1 5/16	1.5	2.6	2.1	1.5
4½	1½	1.8	3.1	2.5	1.8
5	1⅝	2.25	3.9	3.2	2.25
5½	1¾	2.6	4.5	3.7	2.6
6	2	3.1	5.4	4.4	3.1
6½	2⅛	3.6	6.2	5.1	3.6

TABLE G-2.—RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE AND WIRE ROPE SLINGS

[In tons of 2,000 pounds]

Rope diameter	Single leg					
	Vertical			Choker		
	A	B	C	A	B	C
	6 × 19 Classification					
¼″	.59	.56	.53	.44	.42	.40
⅜″	1.3	1.2	1.1	.98	.93	.86
½″	2.3	2.2	2.0	1.7	1.6	1.5
⅝″	3.6	3.4	3.0	2.7	2.5	2.2
¾″	5.1	4.9	4.2	3.8	3.6	3.1
⅞″	6.9	6.6	5.5	5.2	4.9	4.1
1″	9.0	8.5	7.2	6.7	6.4	5.4
1⅛″	11	10	9.0	8.5	7.8	6.8
	6 × 37 Classification					
1¼″	13	12	10	9.9	9.2	7.9
1⅜″	16	15	13	12	11	9.6
1½″	19	17	15	14	13	11
1¾″	26	24	20	19	18	15
2″	33	30	26	25	23	20
2¼″	41	38	33	31	29	25

(A)—Socket or Swaged Terminal attachment.
(B)—Mechanical Sleeve attachment.
(C)—Hand Tucked Splice attachment.

TABLE G-3.—RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE SLINGS

[In tons of 2,000 pounds]

Two-leg bridle or basket hitch												
Rope diameter	Vertical			60° bridle			45° bridle			30° bridle		
	A	B	C	A	B	C	A	B	C	A	B	C
6 × 19 Classification												
¼"	1.2	1.1	1.0	1.0	.97	.92	.83	.79	.75	.59	.56	.53
⅜"	2.6	2.5	2.3	2.3	2.1	2.0	1.8	1.8	1.6	1.3	1.2	1.1
½"	4.6	4.4	3.9	4.0	3.8	3.4	3.2	3.1	2.8	2.3	2.2	2.0
⅝"	7.2	6.8	6.0	6.2	5.9	5.2	5.1	4.8	4.2	3.6	3.4	3.0
¾"	10	9.7	8.4	8.9	8.4	7.3	7.2	6.9	5.9	5.1	4.9	4.2
⅞"	14	13	11	12	11	9.6	9.8	9.3	7.8	6.9	6.6	5.5
1"	18	17	14	15	15	12	13	12	10	9.0	8.5	7.2
1⅛"	23	21	18	19	18	16	16	15	13	11	10	9.0
6 × 37 Classification												
1¼"	26	24	21	23	21	18	19	17	15	13	12	10
1⅜"	32	29	25	28	25	22	22	21	18	16	15	13
1½"	38	35	30	33	30	26	27	25	21	19	17	15
1¾"	51	47	41	44	41	35	36	33	29	26	24	20
2"	66	64	53	57	53	46	47	43	37	33	30	26
2¼"	83	76	66	72	66	57	58	54	47	41	38	33

(A)—Socket or Swaged Terminal Attachment.
(B)—Mechanical Sleeve Attachment.
(C)—Hand Tucked Splice Attachment.

TABLE G-4.—RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE AND WIRE ROPE SLINGS

[In tons of 2,000 pounds]

Rope diameter	Single leg					
	Vertical			Choker		
	A	B	C	A	B	C
	6 × 19 Classification					
¼"	.55	.51	.49	.41	.38	.37
⅜"	1.2	1.1	1.1	.91	.85	.80
½"	2.1	2.0	1.8	1.6	1.5	1.4
⅝"	3.3	3.1	2.8	2.5	2.3	2.1
¾"	4.8	4.4	3.9	3.6	3.3	2.9
⅞"	6.4	5.9	5.1	4.8	4.5	3.9
1"	8.4	7.7	6.7	6.3	5.8	5.0
1⅛"	10	9.5	8.4	7.9	7.1	6.3
	6 × 37 Classification					
1¼"	12	11	9.8	9.2	8.3	7.4
1⅜"	15	13	12	11	10	8.9
1½"	17	16	14	13	12	10
1¾"	24	21	19	18	16	14
2"	31	28	25	23	21	18

(A)—Socket or Swaged Terminal attachment.
(B)—Mechanical Sleeve attachment.
(C)—Hand Tucked Splice attachment.

TABLE G-5—RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE SLINGS

[In tons of 2,000 pounds]

Rope diameter	Two-leg bridle or basket hitch											
	Vertical			60° bridle			45° bridle			30° birdle		
	A	B	C	A	B	C	A	B	C	A	B	C
	6 × 19 Classification											
¼"	1.1	1.0	.99	.95	.88	.85	.77	.72	.70	.55	.51	.49
⅜"	2.4	2.2	2.1	2.1	1.9	1.8	1.7	1.6	1.5	1.2	1.1	1.1
½"	4.3	3.9	3.7	3.7	3.4	3.2	3.0	2.8	2.6	2.1	2.0	1.8
⅝"	6.7	6.2	5.6	5.8	5.3	4.8	4.7	4.4	4.0	3.3	3.1	2.8
¾"	9.5	8.8	7.8	8.2	7.6	6.8	6.7	6.2	5.5	4.8	4.4	3.9
⅞"	13	12	10	11	10	8.9	9.1	8.4	7.3	6.4	5.9	5.1
1"	17	15	13	14	13	11	12	11	9.4	8.4	7.7	6.7
1⅛"	21	19	17	18	16	14	15	13	12	10	9.5	8.4
	6 × 37 Classification											
1¼"	25	22	20	21	19	17	17	16	14	12	11	9.8
1⅜"	30	27	24	26	23	20	21	19	17	15	13	12
1½"	35	32	28	30	27	24	25	22	20	17	16	14
1¾"	48	43	38	41	37	33	34	30	27	24	21	19
2"	62	55	49	53	48	43	43	39	35	31	28	25

(A)—Socket or Swaged Terminal attachment.
(B)—Mechanical Sleeve attachment.
(C)—Hand Tucked Splice attachment.

TABLE G-6.—NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel, rope diameter, inches	Number of clips		Minimum spacing, inches
	Drop forged	Other material	
(1)	....	....	....
½	3	4	3
⅝	3	4	3¾
¾	4	5	4½
⅞	4	5	5¼
1	4	6	6
1⅛	5	6	6¾
1¼	5	7	7½
1⅜	6	7	8¼
1½	6	8	9

[1] Three clips shall be used on wire size less than ½-inch diameter.

TABLE G-7—WROUGHT IRON CHAIN

[In pounds or tons of 2,000 pounds]

Nominal size chains stock	Single leg	60° bridle	45° bridle	30° bridle
¼"[1]	1060	1835	1500	1060
5/16"[1]	1655	2865	2340	1655
⅜"[1]	2385	2.1	3370	2385
7/16"[1]	3250	2.8	2.3	3250
½"	2.1	3.7	3.0	2.1
9/16"[1]	2.7	4.6	3.8	2.7
⅝"	3.3	5.7	4.7	3.3
¾"	4.8	8.3	6.7	4.8
⅞"	6.5	11.2	9.2	6.5
1"	8.5	14.7	12.0	8.5
1⅛"	10.0	17.3	14.2	10.0
1¼"	12.4	21.4	17.5	12.4
1⅜"	15.0	25.9	21.1	15.0
1½"	17.8	30.8	25.2	17.8
1⅝"	20.9	36.2	29.5	20.9
1¾"	24.2	42.0	34.3	24.2
1⅞"	27.6	47.9	39.1	27.6
2"	31.6	54.8	44.8	31.6

[1] These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8.—ALLOY STEEL CHAIN

[In tons of 2,000 pounds]

Nominal size chain stock	Single leg	60° bridle	45° bridle	30° bridle
¼"	1.62	2.82	2.27	1.62
⅜"	3.30	5.70	4.65	3.30
½"	5.62	9.75	7.90	5.62
⅝"	8.25	14.25	11.65	8.25
¾"	11.5	19.9	16.2	11.5
⅞"	14.3	24.9	20.3	14.3
1"	19.3	33.5	27.3	19.8
1⅛"	22.2	38.5	31.5	22.2
1¼"	28.7	49.7	40.5	28.7
1⅜"	33.5	58.0	47.0	33.5
1½"	39.7	68.5	56.0	39.7
1⅝"	42.5	73.5	59.5	42.5
1¾"	47.0	81.5	62.0	47.0

TABLE G-9.—MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in fraction of inches
¼(9/32)	3/64
⅜	5/64
½	7/64
⅝	9/64
¾	5/32
⅞	1-1/64
1	3/16
1⅛	7/32
1¼	¼
1⅜	9/32
1½	5/16
1¾	1-1/32

TABLE G-10.—SAFE WORKING LOADS FOR SHACKLES

[In tons of 2,000 pounds]

Material size (inches)	Pin diameter (inches)	Safe working load
½	⅝	1.4
⅝	¾	2.2
¾	⅞	3.2
⅞	1	4.3
1	1⅛	5.6
1⅛	1¼	6.7
1¼	1⅜	8.2
1⅜	1½	10.0
1½	1⅝	11.9
1¾	2	16.2
2	2¼	21.2

TABLE I-1.—FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operation	Shade No.
Soldering	2.
Torch Brazing	3 or 4.
Light cutting, up to 1 inch	3 or 4.
Medium cutting, 1–6 inches	4 or 5.
Heavy cutting, over 6 inches	5 or 6.
Light gas welding, up to ⅛ inch.	4 or 5.
Medium gas welding, ⅛–½ inch.	5 or 6.
Heavy gas welding, over ½ inch.	6 or 8.
Shielded Metal-Arc Welding 1/16 to 5/32-inch electrodes	10.
Inert-gas Metal-Arc Welding (Non-ferrous) 1/16- to 5/32-inch electrodes.	11.
Shielded Metal-Arc Welding: 3/16- to ¼-inch electrodes	12.
5/16- and ⅜-inch electrodes	14.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART H—TOOLS AND RELATED EQUIPMENT

1915.131 General precautions.
1915.132 Portable electric tools.
1915.133 Hand tools.
1915.134 Abrasive wheels.
1915.135 Power actuated fastening tools.
1915.136 Internal combustion engines other than ship's equipment.

SUBPART H—TOOLS AND RELATED EQUIPMENT

1915.131—GENERAL PRECAUTIONS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Hand lines, slings, tackles of adequate strength, or carriers such as tool bags with shoulder straps shall be provided and used to handle tools, materials, and equipment so that employees will have their hands free when using ship's ladders and access ladders. The use of hose or electric cords for this purpose is prohibited.

(b) When air tools of the reciprocating type are not in use, the dies and tools shall be removed.

(c) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(d) The moving parts of machinery on dry dock shall be guarded.

(e) Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.

(f) The moving parts of drive mechanisms, such as gearing and belting on large portable tools, shall be adequately guarded.

(g) Headers, manifolds and widely spaced hose connection on compressed air lines shall bear the work "air" in letters at least 1 inch high, which shall be painted either on the manifold or separate hose connections, or on signs permanently attached to the manifolds or connections. Grouped air connections may be marked in one location.

(h) Before use, compressed air hose shall be examined. Visibly damaged and unsafe hose shall not be used.

1915.132—PORTABLE ELECTRIC TOOLS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking except that paragraph (e) of this section applies to ship repairing only.

(a) The frames of portable electric tools and appliances, except double insulated tools approved by Underwriters' Laboratories, shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(b) Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(c) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.

(d) Worn or frayed electric cables shall not be used.

(e) The employer shall notify the officer in charge of the vessel before using electric power tools operated with the vessel's current.

1915.133—HAND TOOLS

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Employers shall not issue or permit the use of unsafe hand tools.

(b) Wrenches, including crescent, pipe, end and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.

(c) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(d) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

1915.134—ABRASIVE WHEELS

This section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(b) Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed ⅛ inch from the surface of the wheel.

(c) Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard in accordance with the provisions of the United States of America Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of paragraph (e) of this section, except as follows:

(1) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in paragraph (f) of this section shall be used.

(2) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(d) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of paragraph (f) of this section, except as follows:

(1) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(2) If the wheel is entirely within the work being ground while in use.

(e) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

(f) When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to insure that the pieces of the wheel will be retained in case of accidental breakage shall be used.

(g) All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.

(h) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(i) The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.

(j) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of §§ 1915.151(a) and (b), except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

1915.135—POWDER ACTUATED FASTENING TOOLS

(a) The section shall apply to ship repairing and shipbuilding only.

(b) General precautions.

(1) Powder actuated fastening tools shall be tested each day before loading to ensure that the safety devices are in proper working condition. Any tool found not to be in proper working order shall be immediately removed from service until repairs are made.

(2) Powder actuated fastening tools shall not be used in an explosive or flammable atmosphere.

(3) All tools shall be used with the type of shield or muzzle guard appropriate for a particular use.

(4) Fasteners shall not be driven into very hard or brittle materials such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick or hollow title.

(5) Fasteners shall not be driven into soft materials unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the opposite side.

(6) Unless a special guard, fixture or jig is used, fasteners shall not be driven directly into materials such as brick or concrete within 3 inches of the unsupported edge or corner, or into steel surfaces within ½ inch of the unsupported edge or corner. When fastening other material, such as 2 × 4 inch lumber to a concrete surface, fasteners of greater than 7/32 inch shank diameter shall not be used and fasteners shall not be driven within 2 inches of the unsupported edge or corner of the work surface.

(7) Fasteners shall not be driven through existing holes unless a positive guide is used to secure accurate alignment.

(8) No attempt shall be made to drive a fastener into a spalled area caused by an unsatisfactory fastening.

(9) Employees using powder actuated fastening tools shall be protected by eye protection equipment in accordance with the requirements of §§ 1915.151 (a) and (b).

(c) Instruction of operators. Before employees are permitted to use powder actuated tools, they shall have been thoroughly instructed by a competent person with respect to the requirements of paragraph (b) of this section and the safe use of such tools as follows:

(1) Before using a tool, the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstructions.

(2) When a tool develops a defect during use, the operator shall immediately cease to use it and shall notify his supervisor.

(3) Tools shall not be loaded until just prior to the intended firing time and the tool shall not be left unattended while loaded.

(4) The tool, whether loaded or empty, shall not be pointed at any person, and hands shall be kept clear of the open barrel end.

(5) In case of a misfire, the operator shall hold the tool in the operating position for at least 15 seconds and shall continue to hold the muzzle against the work surface during disassembly or opening of the tool and removal of the powder load.

(6) Neither tools nor powder charges shall be left unattended in places where they would be available to unauthorized persons.

1915.136—INTERNAL COMBUSTION ENGINES, OTHER THAN SHIP'S EQUIPMENT

The provisions of this section shall apply to ship repairing, shipbuilding and shipbreaking.

(a) When internal combustion engines furnished by the employer are used in a fixed position below decks, for such purposes as driving pumps, generators, and blowers, the exhaust shall be led to the open air, clear of any ventilation intakes and openings through which it might enter the vessel.

(b) All exhaust line joints and connections shall be checked for tightness immediately upon starting the engine, and any leaks shall be corrected at once.

(c) When internal combustion engines on vehicles, such as forklifts and mobile cranes, or on portable equipment such as fans, generators, and pumps exhaust into the atmosphere below decks, the competent person shall make tests of the carbon monoxide content of the atmosphere as frequently as conditions require to ensure that dangerous concentrations do not develop. Employees shall be removed from the compartment involved when the carbon monoxide concentration exceeds 50 parts per million (0.005%). The employer shall use blowers sufficient in size and number and so arranged as to maintain the concentration below this allowable limit before work is resumed.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1915.151 Eye protection.
1915.152 Respiratory protection.
1915.153 Head, foot and body protection.
1915.154 Lifesaving equipment.

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1915.151—EYE PROTECTION

(a) General precautions.

(1) All eye protection equipment required by these regulations shall meet the specifications prescribed by the American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1.

(2) Eye protection equipment shall be maintained in good condition.

(3) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personnel spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

(b) Protection against impact.

(1) In any operations such as chipping, caulking, drilling, riveting, grinding, and pouring babbitt metal, in which the eye hazard of flying particles, molten metal, or liquid chemical exists, employees shall be protected by suitable face shields or goggles meeting the requirements of paragraph (a) of this section.

(c) Protection against radiant energy.

(1) In any operation in which the eye hazard of injurious light rays or other radiant energy exists, depending upon the intensity of the radiation to which employees are exposed, they shall be protected by spectacles, cup goggles, helmets, hand shields, or face shields equipped with filter lenses meeting the requirements of paragraphs (a) and (c)(2) of this section.

(2) Filter lenses shall be of a shade number appropriate to the type of work to be performed as indicated in Table I-1 in § 1915.118, except that variation of one or two shade numbers are permissible to suit individual preferences.

(3) If filter lenses are used in the goggles worn under the helmet, the shade number of the lens in the helmet may be reduced so that the sum of the shade numbers of the two lenses will equal the value shown in Table I-1 in § 1915.118.

1915.152—RESPIRATORY PROTECTION

(a) General.

(1) All respiratory equipment required by this Part shall be approved for the use for which it is intended by the Mine Safety and Health Administration and the National Institute of Occupational Safety and Health pursuant to the provisions of 30 CFR Part 11. Respiratory protective equipment shall be used only for the purpose intended and no modifications of the equipment shall be made.

(2) Respiratory protective equipment shall be inspected regulatory and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(3) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

(4) Employees required to use respiratory protective equipment approved for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(5) When an air line respirator is used, the air line shall be fitted with a pressure regulating valve and a filter which will remove oil water and rust particles. The air intake shall be from a source which is free from all contaminants, such as the exhaust from internal combustion engines.

(6) In all cases when an employee is stationed outside a compartment, tank or space as a tender or safety man for men working inside in an atmosphere immediately dangerous to life, the tender shall have immediately available for emergency use respiratory protective equipment equivalent to that required for the men in the compartment. When a tender is stationed outside a compartment for men working inside in an atmosphere not immediately dangerous to life, the tender shall wear respiratory protective equipment equivalent to that required for the men in the compartment if he is exposed for prolonged periods to the same concentration of atmospheric contaminants.

(b) Protection in atmospheres immediately dangerous to life.

(1) Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or high concentration of the contaminant, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(2) In atmospheres immediately dangerous to life the only approved types of respiratory protective equipment are the following:

(i) Self-contained breathing apparatus, in which the wearer carries with him a supply of oxygen, air, or an oxygen generating material.

(ii) Hose mask with blower, in which a hand or motor operated blower supplies air at high volume and low pressure through a large diameter hose through which the wearer can draw air in case the blower fails.

(iii) If there is known to be more than 16 percent oxygen and less than 2 percent gas by volume, a gas mask equipped with a canister approved for the particular type gas involved.

Note.—A gas mask offers absolutely no protection in an atmosphere deficient in oxygen.

(3) Work in atmospheres immediately dangerous to life shall be performed only in an emergency, as when rescuing a man who has been overcome or when shutting off a source of contamination that cannot otherwise be controlled. When an employee enters such an atmosphere he shall be provided with and use an adequate, attended life line.

(4) In the vicinity of each vessel in which there is a danger of employees being exposed to an atmosphere immediately dangerous to life, the employer shall have on hand and ready for use respiratory protective equipment approved for such use. When such equipment is required, one or more persons shall be thoroughly trained in the use of the equipment.

(c) Protection against gaseous contaminants not immediately dangerous to life.

(1) Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short exposures.

(2) When employees are exposed to a gaseous contaminated atmosphere not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the gaseous contaminant as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator in lower concentrations is permissible.

(ii) In concentrations of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister. Different canisters are approved for specific use against the following gases or groups of gases: Acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide, or combination of the above.

(iii) In low concentrations (less than 0.1 percent by volume), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in paragraph (c)(2)(ii) of this section.

(d) Protection against particulate contaminants not immediately dangerous to life.

(1) When employees are exposed to unsafe concentrations of particular contaminants, such as dusts and fumes, mists and fogs or combinations of solids and liquids, they shall be protected by either air line or filter respirators, except as otherwise provided in this part.

(2) Filter respirators shall be equipped with the proper type of filter. Different filters are approved for specific protection against groups of contaminants, as follows:

(i) Pneumoconiosis-producing dust and nuisance dust filters which provide respiratory protection against pneumoconiosis-producing dusts, such as aluminum, cellulose, cement, charcoal, coal, coke, flour, gypsum, iron ore, limestone and wood.

(ii) Toxic dust filters which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.

(iii) Mist filters which provide respiratory protection against pneumoconiosis-producing mists, chromic acid mists, and nuisance mists.

(iv) Fume filters which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors, such as those from heated metals and other substances).

(v) Filters which provide respiratory protection against combinations of two or more of the contaminants described in paragraphs (d)(2) (i) through (iv) of this section.

(e) Protection against combinations of gaseous and particular contaminants not immediately dangerous to life.

(1) When employees are exposed to combinations of gaseous and particulate contaminants not immediately dangerous to life, as in spray painting they shall be protected by respiratory protective equipment approved for use in the type and concentration of the contaminants, as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator is permissible in lower concentrations.

(ii) In concentrations of gaseous contaminants of less than 2 percent by volume, a canister type gas mask with a combination canister approved for the particular type of gaseous contaminant as specified in paragraph (c)(2) of this section and a filter for the particular type of particulate contaminant as specified in paragraph (d)(1) of this section.

(iii) In low concentrations of gaseous contaminants (less than 0.1 percent by volume) a respirator equipped with the type of cartridge and filter as specified in paragraph (e)(ii) of this section.

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1915.153—HEAD, FOOT AND BODY PROTECTION

(a) When employees are working in areas where there is danger of falling objects they shall be protected by protective hats.

(b) Protective hats shall meet the specifications contained in the United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1. Hats without dielectric strength shall not be used where there is the possibility of contact with electric conductors.

(c) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

(d) The employer shall arrange through means such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use. Metal toe caps from which the covering has been worn shall be insulated when employees are working on exposed energized circuits of the vessel's electrical system.

(e) Employees shall not be permitted to wear excessively greasy clothing when performing hot work operations.

(f) Employees shall be protected by suitable gloves when engaged in operations hazardous to their hands.

1915.154—LIFESAVING EQUIPMENT

(a) Personal flotation devices.

(1) Any personal flotation device shall be approved by the United States Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD or their equivalent, pursuant to 46 CFR Part 160 (Coast Guard Lifesaving Equipment Specifications) and 33 CFR 175.23 (Coast Guard table devices equivalent to personal flotation devices).

(2) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

(b) Safety belts and lifelines.

(1) Safety belts shall be equipped with lifelines which in use are secured with a minimum of slack to a fixed structure.

(2) Prior to each use, belts and lifelines shall be inspected for dry rot, chemical damage, or other defects which may affect their strength. Defective belts and lifelines shall not be used.

(3) When employees are working in any location requiring a safety belt and a lifeline, care shall be exercised to ensure that the lifeline is not cut, pinched, or led over a sharp edge. In hot work operations or those involving the use of acids, solvents, or caustics, the line shall be kept clear to avoid its being burned or weakened. In order to keep the lifeline continuously attached with minimum of slack to a fixed structure the attachment point of the lifeline shall be appropriately changed as the work progresses.

(c) Life rings and ladders.

(1) At least three 30 inch Coast Guard approved life rings with lines attached shall be kept in easily visible and readily accessible places aboard each vessel afloat on which work is being performed. Life rings shall be located, one forward, one aft, and one on the gangway, except on vessels, under 200 feet in length, in which case one at the gangway will be sufficient.

(2) At least one life ring with a line attached shall be located on each staging float alongside a vessel on which work is being performed.

(3) At least 90 feet of line shall be attached to each life ring. Life rings and lines shall be maintained in good condition.

(4) In the vicinity of each vessel afloat in which work is being performed there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event that they fall into the water.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART J—SHIP'S MACHINERY AND PIPING SYSTEMS

1915.161 Scope and application of subpart.
1915.162 Ship's boilers.
1915.163 Ship's piping systems.
1915.164 Ship's propulsion machinery.
1915.165 Ship's deck machinery.

SUBPART J—SHIP'S MACHINERY AND PIPING SYSTEMS

1915.161—SCOPE AND APPLICATION

The standards contained in this subpart shall apply to ship repairing and shipbuilding and shall not apply to shipbreaking.

1915.162—SHIP'S BOILERS

(a) Before work is performed in the fire, steam, or water spaces of a boiler where employees may be subject to injury from the direct escape of a high temperature medium such as steam, or water, oil, or other medium at a high temperature entering from an interconnecting system, the employer shall insure that the following steps are taken:

(1) The isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured, blanked, and tagged indicating that employees are working in the boiler. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working in the boiler, or until the work in the boiler is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured, locked, and tagged.

(2) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

(3) A warning sign calling attention to the fact that employees are working in the boilers shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are out of the boilers.

1915.163—SHIP'S PIPING SYSTEMS

(a) Before work is performed on a valve, fitting, or section of piping in a piping system where employees may be subject to injury from the direct escape of steam, or water, oil, or other medium at a high temperature, the employer shall insure that the following steps are taken:

(1) The isolation and shutoff valves connecting the dead system with the life system or systems shall be secured, blanked, and tagged indicating that employees are working on the systems. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working on the system, or until the work on the system is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, locked, and tagged.

(2) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

1915.164—SHIP'S PROPULSION MACHINERY

(a) Before work is performed on the main engine, reduction gear, or connecting accessories, the employer shall ensure that the following steps are taken:

(1) The jacking gear shall be engaged to prevent the main engine from turning over. A sign shall be posted at the throttle indicating that the jacking gear is engaged. This sign shall not be removed until the jacking gear can be safely disengaged.

(2) If the jacking gear is steam driven, the stop valves to the jacking gear shall be secured, locked, and tagged indicating that employees are working on the main engine.

(3) If the jacking gear is electrically driven, the circuit controlling the jacking gear shall be deenergized by tripping the circuit breaker, opening the switch or removing the fuse, whichever is appropriate. The breaker, switch, or fuse location shall be tagged indicating that employees are working on the main engine.

(b) Before the jacking engine is operated, the following precautions shall be taken:

(1) A check shall be made to ensure that all employees, equipment, and tools are clear of the engine, reduction gear, and its connecting accessories.

(2) A check shall be made to ensure that all employees, equipment and tools are free of the propeller.

(c) Before work is started on or in the immediate vicinity of the propeller, a warning sign calling attention to the fact that employees are working in that area shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are free of the propeller.

(d) Before the main engine is turned over (e.g., when warming up before departure or testing after an overhaul) a check shall be made to ensure that all employees, equipment, and tools are free of the propeller.

1915.165—SHIP'S DECK MACHINERY

(a) Before work is performed on the anchor windlass or any of its attached accessories, the employer shall ensure that the following steps are taken:

(1) The devil claws shall be made fast to the anchor chains.

(2) The riding pawls shall be in the engaged position.

(3) In the absence of devil claws and riding pawls, the anchor chains shall be secured to a suitable fixed structure of the vessel.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART K—PORTABLE, UNFIRED PRESSURE VESSELS, DRUMS AND CONTAINERS, OTHER THAN SHIP'S EQUIPMENT

1915.171 Scope and application of subpart.
1915.172 Portable air receivers and other unfired pressure vessels.
1915.173 Drums and containers.

SUBPART K—PORTABLE, UNFIRED PRESSURE VESSELS, DRUMS AND CONTAINERS, OTHER THAN SHIP'S EQUIPMENT

1915.171—SCOPE AND APPLICATION OF SUBPART

The standards contained in this subpart shall apply to ship repairing and shipbuilding and shall not apply to shipbreaking.

1915.172—PORTABLE AIR RECEIVERS AND OTHER UNFIRED PRESSURE VESSLES

(a) Portable, unfired pressure vessels, built after the effective date of this regulation, shall be marked and reported indicating that they have been designed and constructed to meet the standards of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XIII, Rules for Construction of Unfired Pressure Vessels, 1963. They shall be subjected to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(b) Portable, unfired pressure vessels, not built to the code requirements of paragraph (a) of this section, and built prior to the effective date of this regulation, shall be examined quarterly by a competent person. They shall be subjected yearly to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(c) The relief valves on the portable, unfired pressure vessels in paragraphs (a) and (b) of this section shall be set to the safe working pressure of the vessels, or set to the lowest safe working pressure of the systems, whichever is lower.

(d) A record of such examinations and tests made in compliance with the requirements of paragraphs (a) and (b) of this section shall be maintained.

1915.173—DRUMS AND CONTAINERS

(a) Shipping drums and containers shall not be pressurized to remove their contents.

(b) A temporarily assembled pressurized piping system conveying hazardous liquids or gases shall be provided with a relief valve and by-pass to prevent rupture of the system and the escape of such hazardous liquids or gases.

(c) Pressure vessels, drums and containers containing toxic or flammable liquids or gases shall not be stored or used where they are subject to open flame, hot metal, or other sources of artificial heat.

(d) Unless pressure vessles, drums and containers of 30 gallon capacity or over containing flammable or toxic liquids or gases are placed in an out-of-the-way area where they will not be subject to physical injury from an outside source, barriers or guards shall be erected to protect them from such physical injury.

(e) Containers of 55 gallons or more capacity containing flammable or toxic liquid shall be surrounded by dikes or pans which enclose a volume equal to at least 35 percent of the total volume of the containers.

(f) Fire extinguishers adequate in number and suitable for the hazard shall be provided. These extinguishers shall be located in the immediate area where pressure vessels, drums and containers containing flammable liquids or gases are stored or in use. Such extinguishers shall be ready for use at all times.

PART 1915—SHIPYARD EMPLOYMENT

SUBPART L—ELECTRICAL MACHINERY

1915.181 Electrical circuits and distribution boards.

SUBPART L—ELECTRICAL MACHINERY

1915.181—ELECTRICAL CIRCUITS AND DISTRIBUTION BOARDS

(a) The provisions of this section shall apply to ship repairing and shipbuilding and shall not apply to shipbreaking.

(b) Before an employee is permitted to work on an electrical circuit, except when the circuit must remain energized for testing and adjusting, the circuit shall be deenergized and checked at the point at which the work is to be done to insure that it is actually deenergized. When testing or adjusting an energized circuit a rubber mat, duck board, or other suitable insulation shall be used underfoot where an insulated deck does not exist.

(c) Deenergizing the circuit shall be accomplished by opening the circuit breaker, opening the switch, or removing the fuse, whichever method is appropriate. The circuit breaker, switch, or fuse location shall be tagged to indicate that an employee is working on the circuit. Such tags shall not be removed nor the circuit energized until it is definitely determined that the work on the circuit has been completed.

(d) When work is performed immediately adjacent to an open-front energized board or in back of an energized board, the board shall be covered or some other equally safe means shall be used to prevent contact with any of the energized parts.

PART 1916 [REMOVED]

PART 1917 [REMOVED]

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(d) The term "employee" means any person employed in shipbuilding or related employments on the navigable waters of the United States, including dry docks, graving docks and marine railways, by an employer as defined in paragraph (c) of this section.

(e) The term "gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel including accommodation ladders, gangplanks and brows.

(f) The term "vessel" includes every description of watercraft or others artificial contrivance used or capable of being used as a means of transportation on water, including special purpose floating structures not primarily designed for or used as a means of transportation on water.

(g) For purposes of § 1916.44, the term "barge" means an unpowered, flat bottom, shallow draft vessel including scows, carfloats and lighters. For purposes of this section, the term does not include ship shaped or deep draft barges.

(h) For purposes of § 1916.44, the term "river tow boat" means a shallow draft, low free board, self-propelled vessel designed to tow river barges by pushing ahead. For purposes of this section, the term does not include other towing vessels.

(i) The term "shipbuilding" means the construction of a vessel, including the installation of machinery and equipment.

(j) The term "related employment" means any employments performed as an incident to or in conjunction with shipbuilding work including, but not restricted to inspection, testing trials and employment as a watchman.

(k) The term "hazardous substance" means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

(l) The term "competent person" for purposes of this part means a person who is capable of recognizing and evaluating employee exposure to hazardous substances or to other unsafe conditions and is capable of specifying the necessary protection and precautions to be taken to ensure the safety of employees as required by the particular regulation under the condition to which it applies. For the purposes of Subparts C and D of this part, except for § 1916.24 (b)(8), to which the above definition applies, the competent person must also meet the additional requirements of § 1916.10.

(m) The term "confined space" means a compartment of small size and limited access such as a double bottom tank, cofferdam, or other space which by its small size and confined nature can readily create or aggravate a hazardous exposure.

(n) The term "enclosed space" means any space, other than a confined space, which is enclosed by bulkheads and overhead. It includes cargo holds, tanks, quarters and machinery and boiler spaces.

(o) The term "hot work" means riveting, welding, burning or other fire or spark producing operations.

(p) The term "cold work" means any work which does not involve riveting, welding, burning or other fire or spark producing operations.

(q) The term "portable unfired pressure vessel" means any pressure container, or vessel used aboard ship, other than the ship's equipment, containing liquids or gases under pressure, excepting pressure vessels built to ICC regulations under 49 CFR Part 78, Subparts C and H.

(r) The term "powder actuated fastening tool" means a tool or machine which drives a stud, pin or fastener by means of an explosive charge.

(s) For purposes of § 1916.57, the term "hazardous material" means a material which has one or more of the following characteristics:

(1) Has a flash point below 140° F., closed cup, or is subject to spontaneous heating;

(2) Has a threshold limit value below 500 p.p.m. in the case of a gas or vapor, below 500 mg./m.^{3} for fumes, and below 25 m.p.p.c.f. in case of a dust;

(3) Has a single dose oral LD_{50} below 500 mg./kg.

(4) Is subject to polymerization with the release of large amounts of energy;

(5) Is a strong oxidizing or reducing agent;

(6) Causes first degree burns to skin in short time exposure, or is systemically toxic by skin contact; or

(7) In the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes which have one or more of the above characteristics.

1916.3—PENALTY

1916.3--Deleted

[38 F.R. 5467, March 1, 1973.]

1916.4—[RESERVED]

1916.5—REFERENCE SPECIFICATIONS, STANDARDS, AND CODES

Specifications, standards, and codes of agencies of the U.S. Government, to the extent specified in the text, form a part of the regulations of this part. In addition, under the authority vested in the Secretary under the Act, the specifications, standards, and codes of organizations which are not agencies of the U.S. Government, in effect on the date of the promulgation of the regulations of this part as listed below, to the extent specified in the text, form a part of the regulations of this part:

National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. 02110, Subpart B, § 1916.10(a).

Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Ill. 60611, Subpart C §§ 1916.24(b)(7), 1916.25(a)(4); Subpart H, § 1916.72(a).

United States of America Standard Safety Code for Portable Wood Ladders, A14.1–1959, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016, Subpart E, § 1916.42(a)(6).

American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 19917, Subpart K, § 1916.101(a).

Threshold Limit Values, American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202, Subpart C, § 1916.21(b).

United States of America Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels. B7.1–1964, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016, Subpart H, § 1916.74(c).

1916.6—NOTIFICATION OF ACCIDENTS RESULTING IN FATALITIES OR SERIOUS INJURIES

1916.6—Deleted

[38 F.R. 5467, March 1, 1973.]

1916.7—AMENDMENT OF THE REGULATIONS OF THIS PART

The Secretary may at any time, upon his own motion or upon written petition of any interested person setting forth reasonable grounds therefor, and after opportunity has been given to interested persons to present their views, amend or revoke any of the provisions of the regulations of this part.

PART 1916—SHIPBUILDING

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1916.10 Competent person.

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1916.10—COMPETENT PERSON

(a) Designation.

(1) For the purposes of Subparts C, D, and H of this part, except for §§ 1916.24(b)(8) and 1916.25(a)(5), one or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section unless the requirements of Subparts C, D, and H of this part are always carried out by a National Fire Protection Association Certified Marine Chemist.

(2) The employer shall indicate on U.S. Department of Labor Form MAR–8, "Designation of Competent Person" either those employees designated as competent persons or that the prescribed functions of such persons are always carried out by a National Fire Protection Association Certified Marine Chemist in addition to his professional duties. When additions or changes are made in the personnel so designated, a new Form MAR–8 shall be executed. A copy of this executed form shall be forwarded to the nearest office of the Occupational Safety and Health Administration.

(b) Criteria.

The following criteria shall guide the employer in designating employees as competent persons:

(1) Ability to understand the meaning of designations on certificates and of any qualifications relating thereto and to carry out any instructions, either written or oral, left by the National Fire Protection Association Certified Marine Chemist or issued by a consultant or chemist who may be used by the employer to make the tests and inspections required by Subparts C and D of this part.

(2) Ability to use and interpret the readings of an oxygen indicator and a combustible gas indicator. The ability to use and interpret the readings of a carbon monoxide indicator and a carbon dioxide indicator, if the operations involve such hazardous gases.

(3) Familiarity with and understanding of Subparts C, D, and H of this part.

(4) Familiarity with the structure and knowledge of the location and designation of spaces of the types of vessels on which construction work is done.

(5) Capability to perform the tests and inspections required by Subparts C, D, and H of this part and to write the required logs.

(c) Logging of inspections and tests.

(1) When tests and inspections required to be performed by a competent person by any provisions of Subparts C, D, and H of this part, except those referred to in §§ 1916.24(b)(8) and 1916.25(a)(5), are made, a record of the locations, operations performed and date, time, and results of the tests and any instructions resulting therefrom shall be recorded on U.S. Department of Labor Form MAR–9, "Log of Inspections and Tests by Competent Person." A separate form shall be used for each vessel on which tests and inspections are made.

(2) This record shall be available for inspection in the immediate vicinity of the affected operations while they are in progress. This record or copy thereof shall be kept on file for a period of at least 3 months from the date of the completion of the job.

(d) Application.

The provisions of this section are intended to apply in their entirety to employers engaged in general vessel construction. They do not apply in their entirety to employers whose work involves only certain portions of Subparts C and D of this part, such as the building of some wooden vessels, where only knowledge of the precautions to be taken when using flammable paints is necessary. In such cases employers may designate persons who are competent on the basis of the applicable portions of the criteria set forth in paragraph (b) of this section

PART 1916—SHIPBUILDING

SUBPART C—SURFACE PREPARATION AND PRESERVATION

1916.21 Toxic cleaning solvents.
1916.22 Chemical paint and preservative removers.
1916.23 Mechanical paint removers.
1916.24 Painting.
1916.25 Flammable liquids.

SUBPART C—SURFACE PREPARATION AND PRESERVATION

1916.21—TOXIC CLEANING SOLVENTS

(a) When toxic solvents are used, the employer shall employ one or more of the following measures to safeguard the health of employees exposed to these solvents.

(1) The cleaning operation shall be completely enclosed to prevent the escape of vapor into the working space.

(2) Either natural ventilation or mechanical exhaust ventilation shall be used to remove the vapor at the source and to dilute the concentration of vapors in the working space to a concentration which is safe for the entire work period.

(3) Employees shall be protected against toxic vapors by suitable respiratory protective equipment in accordance with the requirements of § 1916.82 (a) and (c), and, where necessary, against exposure of skin and eyes to contact with toxic solvents and their vapors by suitable clothing and equipment.

(b) The principles in the threshold limit values to which attention is directed in § 1916.5 will be used by the Department of Labor in enforcement proceedings in defining a safe concentration of air contaminants.

(c) When flammable solvents are used, precautions shall be taken in accordance with the requirements of § 1916.25.

1916.22—CHEMICAL PAINT AND PRESERVATIVE REMOVERS

(a) Employees shall be protected against skin contact during the handling and application of chemical paint and preservative removers and shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 1916.81 (a) and (b).

(b) When using flammable paint and preservative removers, precautions shall be taken in accordance with the requirements of § 1916.25.

(c) When using chemical paint and preservative removers which contain volatile and toxic solvents, such as benzol, acetone and amyl acetate, the provisions of § 1916.21 shall be applicable.

(d) When using paint and rust removers containing strong acids or alkalies, employees shall be protected by suitable face shields to prevent chemical burns on the face and neck.

(e) When steam guns are used, all employees working within range of the blast shall be protected by suitable face shields. Metal parts of the steam gun itself shall be insulated to protect the operator against heat burns.

1916.23—MECHANICAL PAINT REMOVERS

(a) Power tools.

(1) Employees engaged in the removal of paints, preservatives, rusts or other coatings by means of power tools shall be protected against eye injury by goggles or face shields in accordance with the requirements of § 1916.81(a).

(2) All portable rotating tools used for the removal of paints, preservatives, rusts or other coatings shall be adequately guarded to protect both the operator and nearby workers from flying missiles.

(3) Portable electric tools shall be grounded in accordance with the requirements of § 1916.72 (a) and (b).

(4) In a confined space, mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum shall be used, or employees shall be protected by respiratory protective equipment in accordance with the requirements of § 1916.82 (a) and (d).

(b) Flame removal.

(1) Hardened preservative coatings shall not be removed by flame in enclosed spaces unless the employees exposed to fumes are protected by air line respirators in accordance with the requirements of § 1916.82(a). Employees performing such an operation in the open air, and those exposed to the resulting fumes, shall be protected by a fume filter type respirator in accordance with requirements of paragraphs (a) and (d) (2) (iv) of § 1916.82.

(2) Flame or heat shall not be used to remove soft and greasy preservative coatings.

(c) Abrasive blasting.

(1) Equipment. Hoses and fittings used for abrasive blasting shall meet the following requirements:

(i) Hoses. Hose of a type to prevent shocks from static electricity shall be used.

(ii) Hose couplings. Hose lengths shall be joined by metal couplings secured to the outside of the hose to avoid erosion and weakening of the couplings.

(iii) Nozzles. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally.

(iv) Dead man control. A dead man control device shall be provided at the nozzle end of the blasting hose either to provide direct cut off or to signal the pot tender by means of a visual and audible signal to cut off the flow, in the event the blaster loses control of the hose. The pot tender shall be available at all times to respond immediately to the signal.

(2) Replacement. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

(3) Personal protective equipment.

(i) Abrasive blasters working in enclosed spaces shall be protected by hoods and air fed respirators or by air helmets of a positive pressure type in accordance with the requirements of § 1916.82(a).

(ii) Abrasive blasters working in the open shall be protected as indicated in subdivision (i) of this subparagraph except that when synthetic abrasives containing less than one percent free silica are used, filter type respirators approved by the Bureau of Mines for exposure to lead dusts may be used in accordance with § 1916.82 (a) and (d).

(iii) Employees, other than blasters, including machine tenders and abrasive recovery men, working in areas where unsafe concentrations of abrasive materials and dusts are present shall be protected by eye and respiratory protective equipment in accordance with the requirements of §§ 1916.81 (a) and (b) and 1916.82 (a) and (d).

(iv) The blaster shall be protected against injury from exposure to the blast by appropriate protective clothing, including gloves.

(v) Since surges from drops in pressure in the hose line can be of sufficient proportions to throw the blaster off the staging, the blaster shall be protected by a safety belt when blasting is being done from elevations where adequate protection against falling cannot be provided by railings.

1916.24—PAINTING

(a) Paints mixed with toxic vehicles or solvents.

(1) When paints mixed with toxic vehicles or solvents are sprayed, the following conditions shall apply:

(i) In confined spaces, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of § 1916.82 (a).

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of § 1916.82(a). Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of § 1916.82 (a) and (e).

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of § 1916.82 (a) and (e).

(2) Where brush application of paints with toxic solvents is done in confined spaces, or other areas where lack of ventilation creates a hazard, employees shall be protected by filter respirators in accordance with the requirements of § 1916.82 (a) and (c).

(3) When flammable paints or vehicles are used, precautions shall be taken in accordance with the requirements of § 1915.25.

(4) The metallic parts of air moving devices, including fans, blowers, and jet-type air movers, and all duct work shall be electrically bonded to the vessel's structure.

(b) Paints and tank coatings dissolved in highly volatile toxic and flammable solvents.

Several organic coatings, adhesives and resins are dissolved in highly toxic, flammable and explosive solvents with flash points below 80° F. Work involving such materials shall be done only when all of the following special precautions have been taken:

(1) Sufficient exhaust ventilation shall be provided to keep the concentration of solvent vapors below ten (10) percent of the lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(2) If the ventilation fails or if the concentration of solvent vapors rises above ten (10) percent of the lower explosive limit, painting shall be stopped and the compartment shall be evacuated until the concentration again falls below ten (10) percent of the lower explosive limit. If the concentration does not fall when painting is stopped, additional ventilation to bring the concentration down to ten (10) percent of the lower explosive limit shall be provided.

(3) Ventilation shall be continued after the completion of painting until the space or compartment is gas free. The final determination as to whether the space or compartment is gas free shall be made after the ventilating equipment has been shut off for at least ten minutes.

(4) Exhaust ducts shall discharge clear of working areas and away from sources of possible ignition. Periodic tests shall be made to ensure that the exhausted vapors are not accumulating in other areas within or around the vessel or dry dock.

(5) All motors and control equipment shall be of the explosion-proof type. Fans shall have nonferrous blades. Portable air ducts shall also be of nonferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(6) Only non-sparking paint buckets, spray guns and tools shall be used. Metal parts of paint brushes and rollers shall be insulated. Staging shall be erected in a manner which ensures that it is non-sparking.

(7) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard, shall be used.

(8) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty (50) feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(9) The face, eyes, head, hands and all other exposed parts of the bodies of employees handling such highly volatile paints shall be protected. All footwear shall be non-sparking, such as rubbers, rubber boots, or rubber soled shoes without nails. Coveralls or other outer clothing shall be of cotton. Rubber, rather than plastic gloves shall be used because of the danger of static sparks.

(10) No matches, lighted cigarettes, cigars, or pipes, and no cigarette lighters or ferrous articles shall be taken into the area where work is being done.

(11) All solvent drums taken into the compartment shall be placed on nonferrous surfaces and shall be grounded to the vessel. Metallic contact shall be maintained between containers and drums when materials are being transferred from one to another.

(12) Spray guns, paint pots, and metallic parts of connecting tubing shall be electrically bonded, and the bonded assembly shall be grounded to the vessel.

(13) All employees continuously in a compartment in which such painting is being performed, shall be protected by air line respirators in accordance with the requirements of § 1916.82(a) and by suitable protective clothing. Employees entering such compartments for a limited time shall be protected by filter cartridge type respirators in accordance with the requirements of § 1916.82 (a) and (e).

(14) All employees doing exterior paint spraying with such paints shall be protected by suitable filter cartridge type respirators in accordance with the requirements of § 1916.82 (a) and (e) and by suitable protective clothing.

1916.25—FLAMMABLE LIQUIDS

(a) In all cases when liquid solvents, paint and preservative removers, paints or vehicles, other than those covered by § 1916.24(b), are capable of producing a flammable atmosphere under the conditions of use, the following precautions shall be taken:

(1) Smoking, open flames, arcs and spark-producing equipment shall be prohibited in the area.

(2) Ventilation shall be provided in sufficient quantities to keep the concentration of vapors below ten (10) percent of their lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(3) Scrapings and rags soaked with these materials shall be kept in a covered metal container.

(4) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard shall be used.

(5) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty (50) feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(6) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

PART 1916—SHIPBUILDING

SUBPART D—WELDING, CUTTING AND HEATING

1916.31 Ventilation and protection in welding, cutting and heating.
1916.32 Fire prevention.
1916.33 Welding, cutting and heating in way of preservative coatings.
1916.34 Welding, cutting and heating of hollow metal containers and structures.
1916.35 Gas welding and cutting.
1916.36 Arc welding and cutting.
1916.37 Uses of fissionable material in shipbuilding.

SUBPART D—WELDING, CUTTING AND HEATING

1916.31—VENTILATION AND PROTECTION IN WELDING, CUTTING AND HEATING

(a) Mechanical ventilation; requirements.

(1) For purposes of this section, mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

(b) Welding, cutting and heating in confined spaces.

(1) Except as provided in paragraphs (b) (3) and (c) (2) of this section, either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

(2) The means of access shall be provided to a confined space and ventilation ducts to this space shall be arranged in accordance with § 1916.46(b) (1) and (2).

(3) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of § 1916.82(a), and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(c) Welding, cutting or heating of metals of toxic significance.

(1) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section.

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals.

(iii) Cadmium-bearing filler materials.

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(2) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with local exhaust ventilation in accordance with the requirements of paragraph (a) of this section or employees shall be protected by air line respirators in accordance with the requirements of § 1916.82 (a).

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.

(ii) Cadmium-bearing or cadmium coated base metals.

(iii) Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals.

Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(3) Employees performing such operations in the open air shall be protected by filter type respirators in accordance with the requirements of paragraphs (a) and (d) (2) (iv) of § 1916.82, except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of § 1916.82 (a).

(4) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(d) Inert-gas metal-arc welding.

(1) Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in or be exposed to the process until the following special precautions have been taken:

(i) The use of chlorinated solvents shall be kept at least two hundred (200) feet from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

(ii) Helpers and other employees in the area not protected from the arc by screening as provided in § 1916.36(e) shall be protected by filter lenses meeting the requirements of § 1916.81 (a) and (c). When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type meeting the requirements of § 1916.81 (a) and (c) shall be worn under welding helmets or hand shields to protect the welder against flashes and radiant energy when either the helmet is lifted or the shield is removed.

(iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

(iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of paragraph (c) (2) of this section shall be met to protect against dangerous concentrations of nitrogen dioxide.

(e) General welding, cutting and heating.

(1) Welding, cutting and heating not involving conditions or materials described in paragraphs (b), (c) or (d) of this section may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, and unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

(2) Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of § 1916.81 (a) and (c).

1916.32—FIRE PREVENTION[1]

(a) When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place.

(b) If the object to be welded, cut or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

(c) No welding, cutting or heating shall be done where the application of flammable paints or the presence of other flammable compounds or of heavy dust concentrations creates a hazard.

(d) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. In addition, when hot work is being performed aboard a vessel and pressure is not available on the vessel's fire system, an auxiliary supply of water shall be made available where practicable, consistent with avoiding freezing of the lines or hose.

(e) When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed and for a sufficient period of time after completion of the work to insure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used.

(f) When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(g) In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch hour. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from confined spaces when they are disconnected from the torch or other gas consuming device.

(h) Vaporizing liquid extinguishers shall not be used in enclosed spaces.

(i) Except when the contents are being removed or transferred, drums, pails, and other containers which contain or have contained flammable liquids shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations, or open flames.

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[1] 46 CFR 146.02–20 contains Coast Guard regulations pertaining to welding and cutting while explosives and dangerous cargoes are being handled.

1916.33—WELDING, CUTTING AND HEATING IN WAY OF PRESERVATIVE COATINGS

(a) Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

(b) Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable they shall be stripped from the area to be heated to prevent ignition. A 1½-inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.

(c) Protection against toxic preservative coatings.

(1) In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application, or the employees shall be protected by air line respirators meeting the requirements of § 1916.82(a).

(2) In the open air, employees shall be protected by a filter type respirator in accordance with requirements of § 1916.82(a) and (d).

(d) Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken:

(1) A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will ensure that the welding, cutting or heating can be performed in safety.

(2) The preservative coatings shall be removed for a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heated area may be used to limit the size of the area required to be cleaned. The prohibition contained in § 1916.23(b)(2) shall apply.

(e) Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapors are being produced by the coatings. If such vapors are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to ensure that the operation can be resumed safely.

1916.34—WELDING, CUTTING AND HEATING OF HOLLOW METAL CONTAINERS AND STRUCTURES

(a) Drums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

(b) Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any build-up pressure during the application of heat.

(c) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

(d) Objects such as those listed in paragraph (c) of this section shall also be inspected to determine whether water or other non-flammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

(e) Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure which may build up during the application of heat.

1916.35—GAS WELDING AND CUTTING

(a) Transporting, moving and storing compressed gas cylinders.

(1) Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.

(2) When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings.

(3) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

(4) When cylinders are transported by vehicle, they shall be secured in position.

(5) Valve protection caps shall not be used for lifting cylinders from one verticle position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(6) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(7) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

(8) When work is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valve shall be closed.

(9) Acetylene cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

(b) Placing cylinders.

(1) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(2) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(3) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

(4) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(c) Treatment of cylinders.

(1) Cylinders, whether full or empty, shall not be used as rollers or supports.

(2) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.

(3) No damaged or defective cylinder shall be used.

(d) Use of fuel gas.

The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(1) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.

(2) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1½ turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(3) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(4) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(5) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.

(6) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

(e) Fuel gas and oxygen manifolds.

(1) Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(2) Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces.

(3) Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.

(4) When not in use, manifold and header hose connections shall be capped.

(5) Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

(f) Hose.

(1) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used.

(2) When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 8 inches shall be covered by tape.

(3) All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service.

(4) Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used.

(5) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(6) Boxes used for the storage of gas hose shall be ventilated.

(g) Torches.

(1) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose.

(2) Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

(3) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

(h) Pressure regulators.

Oxygen and fuel gas pressure regulators including their related gauges shall be in proper working order while in use.

1916.36—ARC WELDING AND CUTTING

(a) Manual electrode holders.

(1) Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used.

(2) Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

(b) Welding cables and connectors.

(1) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

(2) Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(3) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(4) Cables in poor repair shall not be used. When a cable, other than the cable lead referred to in subparagraph (2) of this paragraph, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

(c) Ground returns and machine grounding.

(1) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(2) Structures or pipe lines, except pipe lines containing gases or flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by subparagraph (1) of this paragraph.

(3) When a structure of pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.

(4) When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

(5) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(6) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(d) Operating instructions.

Employers shall instruct employees in the safe means of arc welding and cutting as follows:

(1) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(2) Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.

(3) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.

(4) Any faulty or defective equipment shall be reported to the supervisor.

(e) Shielding.

Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

1916.37—USES OF FISSIONABLE MATERIAL IN SHIPBUILDING

(a) In shipbuilding and related activities involving the use of an exposure to sources of ionizing radiation not only on conventionally powered but also on nuclear powered vessels, the applicable provisions of the Atomic Energy Commission's Standards for Protection Against Radiation (10 CFR Part 20), relating to protection against occupational radiation exposure, shall apply.

(b) Any activity which involves the use of radioactive material, whether or not under license from the Atomic Energy Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under Commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

PART 1916—SHIPBUILDING

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1916.41 Scaffolds or staging.
1916.42 Ladders.
1916.43 Guarding of deck openings and edges.
1916.44 Access to vessels.
1916.45 Access to and guarding of dry docks and marine railways.
1916.46 Access to cargo spaces and confined spaces.
1916.47 Working surfaces.

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1916.41—SCAFFOLDS OR STAGING

(a) General requirements.

(1) All scaffolds and their supports, whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4).

(2) All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine or short fiber lumber is prohibited.

(3) Lumber dimensions as given in this subpart are nominal except where given in fractions of an inch.

(4) All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.

(5) Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.

(6) Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms.

(7) No scaffolds shall be erected, moved, dismantled or altered except under the supervision of competent persons.

(8) No welding, burning, riveting or open flame work shall be performed on any stage suspended by means of fiber rope.

(9) Lifting bridles on working platforms suspended from cranes shall consist of four legs so attached that the stability of the platform is assured.

(10) Unless the crane hook has a safety latch or is moused, the lifting bridles on working platforms suspended from cranes shall be attached by shackles to the lower lifting block or other positive means shall be taken to prevent them from becoming accidentally disengaged from the crane hook.

(b) Independent pole wood scaffolds.

(1) All pole uprights shall be set plumb. Poles shall rest on a foundation of sufficient size and strength to distribute the load and to prevent displacement.

(2) In light-duty scaffolds not more than 24 feet in height, poles may be spliced by overlapping the ends not less than 4 feet and securely nailing them together. A substantial cleat shall be nailed to the lower section to form a support for the upper section except when bolted connections are used.

(3) All other poles to be spliced shall be squared at the ends of each splice, abutted, and rigidly fastened together by not less than two cleats securely nailed or bolted thereto. Each cleat shall overlap each pole end by at least 24 inches and shall have a width equal to the face of the pole to which it is attached. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the pole.

(4) Ledgers shall extend over two consecutive pole spaces and shall overlap the poles at each end by not less than 4 inches. They shall be left in position to brace the poles as the platform is raised with the progress of the work. Ledgers shall be level and shall be securely nailed or bolted to each pole and shall be placed against the inside face of each pole.

(5) All bearers shall be set with their greater dimension vertical and shall extend beyond the ledgers upon which they rest.

(6) Diagonal bracing shall be provided between the parallel poles, and cross bracing shall be provided between the inner and outer poles or from the outer poles to the ground.

(7) Minimum dimensions and spacing of members shall be in accordance with Table E-1 in § 1916.68.

(8) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(9) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(c) Independent pole metal scaffolds.

(1) Metal scaffold members shall be maintained in good repair and free of corrosion.

(2) All vertical and horizontal members shall be fastened together with a coupler or locking device which will form a positive connection. The locking device shall be of a type which has no loose parts.

(3) Posts shall be kept plumb during erection and the scaffold shall be subsequently kept plumb and rigid by means of adequate bracing.

(4) Posts shall be fitted with bases supported on a firm foundation to distribute the load. When wooden sills are used, the bases shall be fastened thereto.

(5) Bearers shall be located at each set of posts, at each level, and at each intermediate level where working platforms are installed.

(6) Tubular bracing shall be applied both lengthwise and crosswise as required.

(7) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(8) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(d) Wood trestle and extension trestle ladders.

(1) The use of trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet is prohibited. The total height of base and extension may, however, be more than 20 feet.

(2) The minimum dimensions of the side rails of the trestle ladder, or the base sections of the extension trestle ladder, shall be as follows:

(i) Ladders up to and including those 16 feet long shall have side rails of not less than $1\frac{5}{16}$ x $2\frac{3}{4}$ inch lumber.

(ii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than $1\frac{5}{16}$ x 3 inch lumber.

(3) The side rails of the extension section of the extension trestle ladder shall be parallel and shall have minimum dimensions as follows:

(i) Ladders up to and including 12 feet long shall have side rails of not less than $1\frac{5}{16}$ x $2\frac{1}{4}$ inch lumber.

(ii) Ladders over 12 feet long and up to and including those 16 feet long shall have side rails of not less than $1\frac{5}{16}$ x $2\frac{1}{2}$ inch lumber.

(iii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than $1\frac{5}{16}$ x $2\frac{3}{4}$ inch lumber.

(4) Trestle ladders and base sections of extension trestle ladders shall be so spread that when in an open position the spread of the trestle at the bottom, inside to inside, shall be not less than $5\frac{1}{2}$ inches per foot of the length of the ladder.

(5) The width between the side rails at the bottom of the trestle ladder or of the base section of the extension trestle ladder shall be not less than 21 inches for all ladders and sections 6 feet or less in length. For longer lengths of ladder the width shall be increased at least 1 inch for each additional foot of length. The width between the side rails of the extension section of the trestle ladder shall be not less than 12 inches.

(6) In order to limit spreading, the top ends of the side rails of both the trestle ladder and of the base section of the extension trestle ladder shall be beveled, or of equivalent construction, and shall be provided with a metal hinge.

(7) A metal spreader or locking device to hold the front and back sections in an open position, and to hold the extension section securely in the elevated position, shall be a component of each trestle ladder or extension trestle ladder.

(8) Rungs shall be parallel and level. On the trestle ladder, or on the base section of the extension trestle ladder, rungs shall be spaced not less than 8 inches nor more than 18 inches apart; on the extension section of the extension trestle ladder, rungs shall be spaced not less than 6 inches nor more than 12 inches apart.

(9) Platform planking shall be in accordance with the requirements of paragraph (h) of this section, except that the width of the platform planking shall not exceed the distance between the siderails.

(10) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(e) Painters' suspended scaffolds.

(1) The supporting hooks of swinging scaffolds shall be constructed to be equivalent in strength to mild steel or wrought iron, shall be forged with care, shall be not less than $7/8$ inch in diameter, and shall be secured to a safe anchorage at all times.

(2) The ropes supporting a swinging scaffold shall be equivalent in strength to first-grade $3/4$ inch diameter manila rope properly rigged into a set of standard 6 inch blocks consisting of at least one double and one single block.

(3) Manila and wire ropes shall be carefully examined before each operation and thereafter as frequently as may be necessary to ensure their safe condition.

(4) Each end of the scaffold platform shall be supported by a wrought iron or mild steel stirrup or hanger, which in turn is supported by the suspension ropes.

(5) Stirrups shall be constructed so as to be equivalent in strength to wrought iron $3/4$ inch in diameter.

(6) The stirrups shall be formed with a horizontal bottom member to support the platform, shall be provided with means to support the guardrail and midrail and shall have a loop or eye at the top for securing the supporting hook on the block.

(7) Two or more swinging scaffolds shall not at any time be combined into one by bridging the distance between them with planks or any other form of platform.

(8) No more than two men shall be permitted to work at one time on a swinging scaffold built to the minimum specifications contained in this paragraph. Where heavier construction is used, the number of men permitted to work on the scaffold shall be determined by the size and the safe working load of the scaffold.

(9) Backrails and toeboards shall be in accordance with the requirements of paragraph (i) of this section.

(10) The swinging scaffold platform shall be one of the three types described in subparagraphs (11), (12) and (13) of this paragraph.

(11) The ladder-type platform consists of boards upon a horizontal ladder-like structure, referred to herein as the ladder, the side rails of which are parallel. If this type of platform is used, the following requirements shall be met:

(i) The width between the side rails shall be no more than 20 inches.

(ii) The side rails of ladders in ladder-type platforms shall be equivalent in strength to a beam of clear straight-grained spruce of the dimensions contained in Table E-2 in § 1916.68.

(iii) The side rails shall be tied together with tie rods. The tie rods shall be not less than 5/16 inch in diameter, located no more than 5 feet apart, pass through the rails, and be riveted up tight against washers at both ends.

(iv) The rungs shall be of straight-grained oak, ash, or hickory, not less than 1⅛ inches diameter, with ⅞ inch tenons mortised into the side rails not less than ⅞ inch and shall be spaced no more than 18 inches on centers.

(v) Flooring strips shall be spaced no more than ⅝ inch apart except at the side rails, where 1 inch spacing is permissible.

(vi) Flooring strips shall be cleated on their undersides.

(12) The plank-type platform consists of planks supported on the stirrups or hangers. If this type of platform is used, the following requirements shall be met:

(i) The planks of plank-type platforms shall be of not less than 2 x 10 inch lumber.

(ii) The platform shall be no more than 24 inches in width.

(iii) The planks shall be tied together by cleats of not less than 1 x 6 inch lumber, nailed on their undersides at intervals of not more than 4 feet.

(iv) The planks shall extend not less than 6 inches nor more than 18 inches beyond the supporting stirrups.

(v) A cleat shall be nailed across the platform on the underside at each end outside the stirrup to prevent the platform from slipping off the stirrup.

(vi) Stirrup supports shall be not more than 10 feet apart.

(13) The beam-type platform consists of longitudinal side stringers with cross beams set on edge and spaced not more than 4 feet apart on which longitudinal platform planks are laid. If this type platform is used the following requirements shall be met:

(i) The side stringers shall be of sound, straight-grained lumber, free from knots, and of not less than 2 x 6 inch lumber, set on edge.

(ii) The stringers shall be supported on the stirrups with a clear span between stirrups of not more than 16 feet.

(iii) The stringers shall be bolted to the stirrups by U-bolts passing around the stirrups and bolted through the stringers with nuts drawn up tight on the inside face.

(iv) The ends of the stringers shall extend beyond the stirrups not less than 6 inches nor more than 12 inches at each end of the platform.

(v) The platform shall be supported on cross beams of 2 x 6 inch lumber between the side stringers securely nailed thereto and spaced not more than 4 feet on centers.

(vi) The platform shall be not more than 24 inches wide.

(vii) The platform shall be formed of boards ⅞ inch in thickness by not less than 6 inches in width, nailed tightly together, and extending to the outside face of the stringers.

(viii) The ends of all platform boards shall rest on the top of the cross beams, shall be securely nailed, and at no intermediate points in the length of the platform shall there be any cantilever ends.

(f) Horse scaffolds.

(1) The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E-3 in § 1916.68.

(2) Horses constructed of materials other than lumber shall provide the strength, rigidity and security required of horses constructed of lumber.

(3) The lateral spread of the legs shall be equal to not less than one-third of the height of the horse.

(4) All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure.

(5) Platform planking shall be in accordance with the requirements of paragraph (h) of this section.

(6) Backrails and toeboards shall be in accordance with paragraph (i) of this section.

(g) Other types of scaffolds.

(1) Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of paragraphs (a), (h) and (i) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

(h) Scaffold or platform planking.

(1) Except as otherwise provided in paragraph (e) (11) and (13) of this section, platform planking shall be of not less than 2 x 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

(2) Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

(3) Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members.

(4) Table E-4 in § 1916.68 shall be used as a guide in determining safe loads for scaffold planks.

(i) Backrails and toeboards.

(1) Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway.

(2) Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fiber rope rails shall not be used.

(3) Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted employees working more than five feet above solid surfaces shall be protected by safety belts and life lines meeting the requirements of § 1916.84(b), and employees working over water shall be protected by buoyant work vests meeting the requirements of § 1916.84(a).

(4) Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail.

(5) When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 x 4 inch lumber shall be provided.

(j) Access to staging.

(1) Access from below to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements of § 1916.42 or rigid type non-collapsible trestles with parallel and level rungs.

(2) Ramps and stairways shall be provided with 36-inch handrails with midrails.

(3) Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than one foot from the ladder to any intermediate landing or platform.

(4) Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

(5) Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements of § 1916.42 or a Jacob's ladder properly secured, meeting the requirements of § 1916.44(d).

1916.42—LADDERS

(a) General requirements.

(1) The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs.

(2) When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of the side rails for their total length shall be those specified in paragraphs (b) or (c) of this section.

(3) Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed.

(4) Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Metal Ladders, A14.2.

(5) Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations.

(6) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Wood Ladders, A14.1.

(b) Construction of portable wood cleated ladders up to 30 feet in length.

(1) Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low density woods is prohibited.

(2) Side rails shall be dressed on all sides, and kept free of splinters.

(3) All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than ½ inch in diameter or within ½ inch of the edge of the rail or nearer than 3 inches to a tread or run.

(4) Pitch pockets not exceeding ⅛ inch in width, 2 inches in length and ½ inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

(5) The width between side rails at the base shall be not less than 11½ inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least ¼ inch for each additional 2 feet of length.

(6) Side rails shall be at least 1⅝ x 3⅝ inches in cross section.

(7) Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails ½ inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

(8) Cleats 20 inches or less in length shall be at least $\frac{25}{32}$ x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least $\frac{25}{32}$ x 3¾ inches in cross section.

(c) Construction of portable wood cleated ladders from 30 to 60 feet in length.

(1) Ladders from 30 to 60 feet in length shall be in accordance with the specifications of paragraph (b) of this section with the following exceptions:

(i) Rails shall be of not less than 2 x 6 inch lumber.

(ii) Cleats shall be of not less than 1 x 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fastenings of equivalent strength.

1916.43—GUARDING OF DECK OPENINGS AND EDGES

(a) When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings shall be suitably covered or guarded to a height of not less than 30 inches, except where the use of such guards is made impracticable by the work actually in progress.

(b) When employees are working around open hatches not protected by coamings to a height of 24 inches or around other large openings, the edge of the opening shall be guarded in the working area to a height of 36 to 42 inches, except where the use of such guards is made impracticable by the work actually in progress.

(c) When employees are exposed to unguarded edges of decks, platforms, flats, and similar flat surfaces, more than 5 feet above a solid surface, the edges shall be guarded by adequate guardrails meeting the requirements of § 1916.41(i) (1) and (2), unless the nature of the work in progress or the physical conditions prohibit the use or installation of such guardrails.

(d) When employees are working near the unguarded edges of decks of vessels afloat, they shall be protected by personal flotation devices meeting the requirements of § 1916.84(a).

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(e) Section of bilges in which floor plates or gratings have not been installed shall be guarded by guardrails except where they would interfere with the work in progress. If these open sections are in a walkway, at least two 10-inch planks placed side by side, or equivalent, shall be laid across the opening to provide a safe walking surface.

(f) Gratings, walkways, and catwalks, in which sections of gratings and ladders have not been installed, shall be barricaded with adequate guardrails.

1916.44—ACCESS TO VESSELS

(a) Access to vessels afloat.

The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(1) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and safely secured, shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping, shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of paragraph (d) (1) and (2) of this section may be used.

(2) Each side of such gangway, and the turn table if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with mid rail. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(3) The gangway shall be kept properly trimmed at all times.

(4) When a fixed tread accommodation ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(5) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(6) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with mid rails on both sides.

(7) Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(8) When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(9) Obstructions shall not be laid on or across the gangway.

(10) The means of access shall be adequately illuminated for its full length.

(11) Loads shall not be passed over the means of access while employees are on it.

(b) Access to vessels in drydock or between vessels.

Gangways meeting the requirements of paragraph (a) (1), (2), (8), (9) and (10) of this section shall be provided for access from wing wall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, form one vessel to another.

(c) Access to barges and river towboats.

(1) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained and properly secured.

(2) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of subparagraph (1) of this paragraph or a safe walkway in accordance with the requirements of paragraph (a)(7) of this section shall be provided. When a walkway is impracticable, a substantial ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder in accordance with the requirements of paragraph (d) of this section may be used.

(3) The means of access shall be in accordance with the requirements of paragraph (a)(8), (9) and (10) of this section.

(d) Jacob's ladders

(1) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(2) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

1916.45—ACCESS TO AND GUARDING OF DRY DOCKS AND MARINE RAILWAYS

(a) A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead.

(b) Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a mid rail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(c) Railings meeting the requirements of paragraph (b) of this section shall be provided on the means of access to and from the floors of graving docks.

(d) Railings approximately 42 inches in height, with a mid rail, shall be provided on the edges of wing walls of floating dry docks and on the edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering or leaving the dock.

(e) When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42-inch railings with a mid rail. When such a railing would be impracticable or ineffective, other effective means shall be provided to prevent men from falling into the water.

(f) Access to wingwalls from floors of dry docks shall be by ramps, permanent stairways or ladders meeting the applicable requirements of § 1916.42.

(g) Catwalks on stiles of marine railways shall be no less than 20 inches wide and shall have on at least one side a guardrail and midrail meeting the requirements of § 1916.41(i) (1) and (2).

1916.46—ACCESS TO CARGO SPACES AND CONFINED SPACES

(a) Cargo spaces.

(1) There shall be at least one safe and accessible ladder in any cargo space which employees must enter.

(2) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(3) Straight ladders of adequate strength and suitability secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of subparagraph (1) of this paragraph. When conditions are such that a straight ladder cannot be used, a Jacob's ladder meeting the requirements of § 1916.44 (d) may be used.

(4) Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that equipment, materials or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or the crane signalman of his intention.

(b) Confined spaces.

(1) More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere in the space except where the structure or arrangement of the vessel makes this provision impractical.

(2) When the ventilation ducts required by these regulations must pass through these means of access, the ducts shall be of such a type and so arranged as to permit free passage to an employee through at least two of these means of access.

1916.47—WORKING SURFACES

(a) When firebox floors present tripping hazards of exposed tubing or of missing or removed refractory, sufficient planking to afford safe footing shall be laid while work is being carried on within the boiler.

(b) When employees are working aloft, or elsewhere at elevations more than 5 feet above a solid surface, either scaffolds or a sloping ladder, meeting the requirements of this subpart, shall be used to afford safe footing, or the employees shall be protected by safety belts and lifelines meeting the requirements of § 1916.84 (b). Employees visually restricted by blasting hoods, welding helmets, and burning goggles shall work from scaffolds, not from ladders, except for the initial and final welding or burning operation to start or complete a job, such as the erection and dismantling of hung scaffolding, or other similar, nonrepetitive jobs of brief duration.

(c) For work performed in restricted quarters, such as behind boilers and in between congested machinery units and piping, work platforms at least 20 inches wide meeting the requirements of § 1916.41 (h) (1) shall be used. Backrails may be omitted if bulkheading, boilers, machinery units, or piping afford proper protection against falling.

(d) When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting the requirements of § 1916.84(a).

[39 F.R. 15124, May 1, 1974.]

PART 1916—SHIPBUILDING

SUBPART F—GENERAL WORKING CONDITIONS

1916.51 Housekeeping.
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SUBPART F—GENERAL WORKING CONDITIONS

1916.51—HOUSEKEEPING

(a) Good housekeeping conditions shall be maintained at all times. Adequate aisles and passageways shall be maintained in all work areas. All staging platforms, ramps, stairways, walkways, aisles, and passageways on vessels or drydocks shall be kept clear of all tools, materials, and equipment except that which is in use, and all debris such as welding rod tips, bolts, nuts, and similar material. Hose and electric conductors shall be elevated over or placed under the walkway or working surfaces or covered by adequate crossover planks.

(b) All working areas on vessels and dry docks shall be kept reasonably free of debris, and construction material shall be so piled as not to present a hazard to employees.

(c) Slippery conditions on walkways or working surfaces shall be eliminated as they occur.

(d) Free access shall be maintained at all times to all exits and to all fire-alarm boxes or fire-extinguishing equipment.

(e) All oils, paints, thinners, solvents, waste, rags, or other flammable substances shall be kept in fire resistant covered containers when not in use.

1916.52—ILLUMINATION

(a) All means of access and walkways leading to working areas as well as the working areas themselves shall be adequately illuminated.

(b) Temporary lights shall meet the following requirements:

(1) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(2) Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Splices which have insulation equal to that of the cable are permitted.

(3) Cords shall be kept clear of working spaces and walkways or other locations in which they are readily exposed to damage.

(c) Exposed non-current-carrying metal parts of temporary lights furnished by the employer shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current. Grounding shall be in accordance with the requirements of § 1916.72(b).

(d) Where temporary lighting from sources outside the vessel is the only means of illumination, portable emergency lighting equipment shall be available to provide illumination for safe movement of employees.

(e) Employees shall not be permitted to enter dark spaces without a suitable portable light. The use of matches and open flame lights is prohibited.

(f) Temporary lighting stringers or streamers shall be so arranged as to avoid overloading of branch circuits. Each branch circuit shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

1916.53—UTILITIES

(a) Steam supply and hoses.

(1) Prior to supplying a vessel with steam from a source outside the vessel, the employer shall install a pressure gauge and a relief valve of proper size and capacity at the point where the temporary steam hose joins the vessel's steam piping system or systems. The relief valve shall be set and capable of relieving at a pressure not exceeding the safe working pressure of the vessel's system in its present condition, and there shall be no means of isolating the relief valve from the system which it protects. The pressure gauge and relief valve shall be located so as to be visible and readily accessible.

(2) Steam hose and fittings shall have a safety factor of not less than five (5).

(3) When steam hose is hung in a bight or bights, the weight shall be relieved by appropriate lines. The hose shall be protected against chafing.

(4) Steam hose shall be protected from damage and hose and temporary piping shall be so shielded where passing through normal work areas as to prevent accidental contact by employees.

(b) Electric power.

(1) When the vessel is supplied with electric power from a source outside the vessel, the following precautions shall be taken prior to energizing the vessel's circuits:

(i) If in dry dock, the vessel shall be adequately grounded.

(ii) The employer shall insure that all of the vessel's circuits to be energized are in a safe condition.

(iii) All circuits to be energized shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

(c) Infrared electrical heat lamps.

(1) All infrared electrical heat lamps shall be equipped with guards that surround the lamps with the exception of the face, to minimize accidental contact with the lamps.

1916.54—WORK IN CONFINED OR ISOLATED SPACES

When any work is performed in a confined space, except as provided in § 1916.31(b)(3), or when an employee is working alone in an isolated location, frequent checks shall be made to ensure the safety of the employees.

1916.55—WORK ON OR IN THE VICINITY OF RADAR AND RADIO

(a) No employees other than radar or radio repairmen shall be permitted to work on masts, king posts or other aloft areas unless the radar and radio are secured or otherwise made incapable of radiation. In either event, the radio and radar shall be appropriately tagged.

(b) Testing of radar or radio shall not be done until the employer can schedule such tests at a time when no work is in progress aloft or personnel can be cleared from the danger area according to minimum safe distances established for and based on the type, model, and power of the equipment.

1916.56—WORK IN OR ON LIFEBOATS

(a) Before employees are permitted to work in or on a lifeboat, either stowed or in a suspended position, the employer shall ensure that the boat is secured independently of the releasing gear to prevent the boat from falling due to accidental tripping of the releasing gear and movements of the davits or capsizing of a boat in chocks.

(b) Employees shall not be permitted to remain in boats while the boats are being hoisted into final stowed position.

(c) Employees shall not be permitted to work on the outboard side of lifeboats stowed on their chocks unless the boats are secured by gripes or otherwise secured to prevent them from swinging outboard.

1916.57—HEALTH AND SANITATION

(a) No chemical product, such as a solvent or preservative; no structural material, such as cadmium or zinc coated steel, or plastic material; and no process material, such as welding filler metal; which is a hazardous material within the meaning of § 1916.2(s), shall be used until the employer has ascertained the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling, application, or utilization of such a material.

(b) In order to ascertain the hazards, as required by paragraph (a) of this section, the employer shall obtain the following items of information which are applicable to a specific product or material to be used:

(1) The name, address, and telephone number of the source of the information specified in this paragraph, preferably those of the manufacturer of the product or material.

(2) The trade name and synonyms for a mixture of chemicals, a basic structural material, or for a process material; and the chemical name and synonyms, chemical family, and formula for a single chemical.

(3) Chemical names of hazardous ingredients, including, but not limited to, those in mixtures, such as those in: (i) Paints, preservatives, and solvents; (ii) alloys, metallic coatings, filler metals and their coatings or core fluxes; and (iii) other liquids, solids, or gases (e.g., abrasive materials).

(4) An indication of the percentage, by weight or volume, which each ingredient of a mixture bears to the whole mixture, and of the threshold limit value of each ingredient, in appropriate units.

(5) Physical data about a single chemical or a mixture of chemicals, including boiling point, in degrees Fahrenheit; vapor pressure, in millimeters of mercury; vapor density of gas or vapor (air=1); solubility in water, in percent by weight; specific gravity of material (water=1); percentage volatile, by volume, at 70° F.; evaporation rate for liquids (either butyl acetate or ether may be taken as 1); and appearance and odor.

(6) Fire and explosion hazard data about a single chemical or a mixture of chemicals, including flash point, in degrees Fahrenheit; flammable limits, in percent by volume in air; suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information.

(7) Health hazard data, including threshold limit value, in appropriate units, for a single hazardous chemical or for the individual hazardous ingredients of a mixture, as appropriate; effects of overexposure; and emergency and first aid procedures.

(8) Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization.

(9) Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled.

(10) Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and of ventilation, such as local exhaust, general, special, or other types.

(11) Special precautionary information about handling and storing.

(12) Any other general precautionary information.

(c) The pertinent information required by paragraph (b) of this section shall be recorded either on U.S. Department of Labor Form LSB 00S–4, Material Safety Data Sheet, or on an essentially similar form which has been approved by the Occupational Safety and Health Administration. Copies of Form LSB 00S–4 may be obtained at any of the following regional offices of the Occupational Safety and Health Administration:

(1) North Atlantic Region, 341 Ninth Avenue, Room 920, New York, N.Y. 10001 (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont).

(2) Middle Atlantic Region, Penn Square Building, Juniper and Filbert Streets, Philadelphia, Pa. 19107 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia).

(3) South Atlantic Region, 1371 Peachtree Street NE., Suite 723, Atlanta, Ga. 30309 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee).

(4) Great Lakes Region, 848 Federal Office Building, 219 South Dearborn Street, Chicago, Ill. 60604 (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin).

(5) Mid-Western Region, 2100 Federal Office Building, 911 Walnut Street, Kansas City, Mo. 64106 (Colorado, Iowa, Kansas, Missouri, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming).

(6) Western Gulf Region, 411 North Akard Street, Room 601, Dallas, Tex. 75201 (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas).

(7) Pacific Region, 10353 Federal Building, 450 Golden Gate Avenue, Box 36017, San Francisco, Calif. 94102 (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington).

A completed form shall be preserved and available for inspection for a period of 3 months from the date of the completion of the job.

(d) The employer shall instruct employees who will be exposed to the hazardous materials as to the nature of the hazards and the means of avoiding them.

(e) The employer shall provide all necessary controls, and the employees shall be protected by suitable personal protective equipment against the hazards identified under paragraph (a) of this section and those hazards for which specific precautions are required in Subpart C and D of this part.

(f) The employer shall provide adequate washing facilities for employees engaged in the application of paints or coatings or in other operations where contaminants can, by ingestion or absorption, be detrimental to the health of the employees. The employer shall encourage good personal hygiene practices by informing the employees of the need for removing surface contaminants by thorough washing of hands and face prior to eating or smoking.

(g) The employer shall not permit eating or smoking in areas undergoing surface preparation or preservation.

1916.58—FIRST AID

(a) Unless a first aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close at hand shall be qualified to administer first aid to the injured.

(b) The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item. The contents of such kit shall contain a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch and 2 inch.
Gauze compress bandages, 4 inch.
Adhesive bandages, 1 inch.
Triangular bandage, 40 inch.
Ammonia inhalants and ampules.
Antiseptic applicators or swabs.
Burn dressing.
Eye dressing.
Wire or thin board splints.
Forceps and tourniquet.

(c) The contents of the first aid kit shall be checked before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

(d) There shall be available for each vessel on which ten (10) or more employees are working one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that no more than two stretchers are required on each job location. A blanket or other liner suitable for transferring the patient to and from the stretcher shall be provided. Stretchers shall be kept close to the vessels. This paragraph does not apply where ambulance services which are available are known to carry such stretchers.

1916.59 Commercial diving operations

Commercial diving operations shall be subject to Subpart T of Part 1910, §§ 1910.401–1910.441, of this Chapter.

[42 F.R. 37673, July 22, 1977.]

PART 1916—SHIPBUILDING

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1916.61 Inspection.
1916.62 Ropes, chains and slings.
1916.63 Shackles and hooks.
1916.64 Chain falls and pull-lifts.
1916.65 Hoisting and hauling equipment.
1916.66 Use of gear.
1916.67 Qualifications of operators.
1916.68 Tables.

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1916.61—INSPECTION

(a) All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each shift and, when necessary, at intervals during its use to ensure that it is safe. Defective gear shall be removed and repaired or replaced before further use.

(b) The safe working load of gear as specified in §§ 1916.62 and 1916.63 shall not be exceeded.

1916.62—ROPES, CHAINS AND SLINGS

(a) Manila rope and manila rope slings.

(1) Table G-1 in § 1916.68 shall be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Wire rope and wire rope slings.

(1) Table G-2 through G-5 in § 1916.68 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five (5) is maintained.

(2) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(3) Where U-bolt wire rope clips are used to form eyes, Table G-6 in § 1916.68 shall be used to determine the number and spacing of clips. The U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(4) Wire rope shall not be secured by knots.

(c) Chains and chain slings.

(1) Tables G-7 and G-8 in § 1916.68 shall be used to determine the working load limit of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products.

(2) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(3) Interlink wear, not accompanied by stretch in excess of 5 percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G-9 in § 1916.68 has been reached.

(4) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(5) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in subparagraph (4) of this paragraph shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(6) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.

(7) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

1916.63—SHACKLES AND HOOKS

(a) Shackles.

(1) Table G-10 in § 1916.68 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Hooks.

(1) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(2) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(3) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

1916.64—CHAIN FALLS AND PULL-LIFTS

(a) Chain falls and pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.

(b) Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.

(c) Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear. The upper hook shall be moused or otherwise secured against coming free of its support.

(d) Scaffolding shall not be used as a point of attachment for lifting devices, such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

1916.65—HOISTING AND HAULING EQUIPMENT

(a) Derrick and crane certification:

(1) Derricks and cranes which are part of, or regularly placed aboard, barges, other vessels, or on wingwalls of floating drydocks, and are used to transfer materials or equipment from or to a vessel or drydock, shall be tested and certificated in accordance with the standards provided in Part 1919 of this chapter by persons accredited for that purpose.

(2) Subparagraph (1) of this paragraph shall take effect 180 days after the effective date of this amendment.

(b) The moving parts of hoisting and hauling equipment shall be guarded.

(c) Mobile crawler or truck cranes used on a vessel:

(1) The maximum manufacturer's rated safe workingloads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers shall be conspicuously posted near the controls and shall be visible to the operator. A radius indicator shall be provided.

(2) The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.

(d) Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane either permanently or temporarily mounted, shall be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

(e) Maritime railways:

(1) The cradle or carriage on the marine railway shall be positively blocked or secured when in the hauled position to prevent it from being accidentally released.

1916.66—USE OF GEAR

(a) Loads shall be safely rigged before being hoisted.

(b) Plates shall be handled on and off hulls by means of shackles whenever possible. Clips or pads of ample size shall be welded to the plate to receive the shackle pins when there are no holes in the plate. When it is not possible to make holes in or to weld pads to the plate, alligator tongs, grab hooks, grab clamps or screw clamps may be used. In such cases special precautions shall be taken to keep employees from under such lifts.

(c) Tag lines shall be provided on loads likely to swing or to need guidance.

(d) When slings are secured to eye-bolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.

(e) Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.

(f) Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.

(g) Loose ends of idle legs of slings in use shall be hung on the hook.

(h) Employees shall not be permitted to ride the hook or the load.

(i) Loads (tools, equipment or other materials) shall not be swung or suspended over the heads of employees.

(j) Pieces of equipment or structure susceptible to falling or dislodgement shall be secured as early as possible.

(k) An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.

(l) Pallets, when used, shall be of such material and construction and so maintained as to safely support and carry the loads being handled on them.

(m) A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, shall be completely opened. The beam or pontoon left in place adjacent to an opening shall be sufficiently lashed, locked or otherwise secured to prevent it from being unshipped.

(n) Hatches shall not be opened or closed while employees are in the square of the hatch below.

(o) Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning shall be given to employees in the vicinity of such operations.

(p) At no time shall an employee be permitted to place himself in a hazardous position between a swinging load and a fixed object.

1916.67—QUALIFICATIONS OF OPERATORS

(a) When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.

(b) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

(c) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.

(d) No minor under eighteen (18) years of age shall be employed in occupations involving the operation of any power-driven hoisting apparatus or assisting in such operations by work such as hooking on, loading slings, rigging gear, etc.

1916.68—TABLES

TABLE E-1

DIMENSIONS AND SPACING OF WOOD INDEPENDENT-POLE SCAFFOLD MEMBERS

Structural Members	Light duty (Up to 25 pounds per square foot)			Heavy duty (25 to 75 pounds per square foot)		
	Height in feet			Height in feet		
	24 or less	24–40	40–60	24 or less	24–40	40–60
Poles or uprights (in inches)	2 x 4	3 x 4 or 2 x 6	4 x 4	3 x 4	4 x 4	4 x 6
Bearers (in inches)	2 x 6	2 x 6	2 x 6	2 x 8	2 x 8	2 x 10
Ledgers (in inches)	2 x 6	2 x 6	2 x 6	2 x 8	2 x 8	2 x 8
Stringers (not supporting bearers) (in inches)	1 x 6	1 x 6	1 x 6	1 x 6	1 x 6	1 x 6
Braces (in inches)	1 x 4	1 x 6	1 x 6	1 x 6	1 x 6	1 x 6
Pole spacing—longitudinally (in feet)	7½	7½	7½	7	7	7
Pole spacing—transversely (in feet)	6½ min	7½ min	8½ min	6½	10	10
Ledger spacing—vertically (in feet)	7	7	7	4½	4½	4½

TABLE E-2

SPECIFICATIONS FOR SIDE RAILS OF LADDERS

Length (in feet)	Cross section (in inches)	
	At ends	At center
15	1⅞ x 2¾	1⅞ x 3¾
16	1⅞ x 2¾	1⅞ x 3¾
18	1⅞ x 3	1⅞ x 4
20	1⅞ x 3	1⅞ x 4
24	1⅞ x 3	1⅞ x 4½

TABLE E-3

SPECIFICATIONS FOR THE CONSTRUCTION OF HORSES

Structural members	Height in feet		
	Up to 10	10 to 16	16 to 20
	Inches	*Inches*	*Inches*
Legs	2 x 4	3 x 4	4 x 6
Bearers or headers	2 x 6	2 x 8	4 x 6
Crossbraces	2 x 4 or 1 x 8	2 x 4	2 x 6
Longitudinal braces	2 x 4	2 x 6	2 x 6

TABLE E-4

SAFE CENTER LOADS FOR SCAFFOLD PLANK OF 1,100 POUNDS FIBRE STRESS

Span in Feet	Lumber dimensions in inches									
	A	B	A	B	A	B	A	B	A	B
	2 x 10	1⅝ x 9½	2 x 12	1⅝ x 11½	3 x 8	2⅝ x 7½	3 x 10	2⅝ x 9½	3 x 12	2⅝ x 11½
6	256		309		526		667		807	
8	192		232		395		500		605	
10	153		186		316		400		484	
12	128		155		263		333		404	
14	110		133		225		286		346	
16			116		197		250		303	

(A)—Rough lumber
(B)—Dressed lumber

TABLE G-1
MANILA ROPE
(In pounds or tons of 2000 pounds)

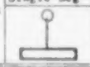
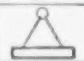
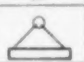
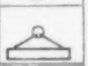
Circumference	Diameter in Inches	Single Leg	60°	45°	30°
					
3/4	1/4	120 lbs.	204 lbs.	170 lbs.	120 lbs.
1	5/16	200	346	282	200
1-1/8	3/8	270	467	380	270
1-1/4	7/16	350	605	493	350
1-3/8	15/32	450	775	635	450
1-1/2	1/2	530	915	798	530
1-3/4	9/16	690	1190	973	690
2	5/8	880	1520	1240	880
2-1/4	3/4	1080	1870	1520	1080
2-1/2	13/16	1300	2250	1830	1300
2-3/4	7/8	1540	2660	2170	1540
3	1	1800	3120	2540	1800
3-1/4	1-1/16	1.0 Tons	1.7 Tons	1.4 Tons	1.0 Tons
3-1/2	1-1/8	1.2	2.1	1.7	1.2
3-3/4	1-1/4	1.35	2.3	1.9	1.35
4	1-5/16	1.5	2.6	2.1	1.5
4-1/2	1-1/2	1.8	3.1	2.5	1.8
5	1-5/8	2.25	3.9	3.2	2.25
5-1/2	1-3/4	2.6	4.5	3.7	2.6
6	2	3.1	5.4	4.4	3.1
6-1/2	2-1/8	3.6	6.2	5.1	3.6

TABLE G-2

RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE AND WIRE ROPE SLINGS

(In tons of 2000 pounds)

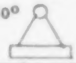
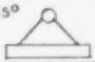
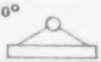
Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4"	.59	.56	.53	.44	.42	.40
3/8"	1.3	1.2	1.1	.98	.93	.86
1/2"	2.3	2.2	2.0	1.7	1.6	1.5
5/8"	3.6	3.4	3.0	2.7	2.5	2.2
3/4"	5.1	4.9	4.2	3.8	3.6	3.1
7/8"	6.9	6.6	5.5	5.2	4.9	4.1
1"	9.0	8.5	7.2	6.7	6.4	5.4
1-1/8"	11.	10.	9.0	8.5	7.8	6.[illegible]
6x37 CLASSIFICATION						
1-1/4"	13.	12.	10.	9.9	9.2	7.9
1-3/8"	16.	15.	13.	12.	11.	9.6
1-1/2"	19.	17.	15.	14.	13.	11.
1-3/4"	26.	24.	20.	19.	18.	15.
2"	33.	30.	26.	25.	23.	20.
2-1/4"	41.	38.	33.	31.	29.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-3

RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE SLINGS

(In tons of 2000 pounds)

Rope Dia. Inches	TWO - LEG BRIDLE OR BASKET HITCH											
	Vertical			60° 			45° 			30° 		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4"	1.2	1.1	1.0	1.0	.97	.92	.83	.79	.75	.59	.56	.53
3/8"	2.6	2.5	2.3	2.3	2.1	2.0	1.8	1.8	1.6	1.3	1.2	1.1
1/2"	4.6	4.4	3.9	4.0	3.8	3.4	3.2	3.1	2.8	2.3	2.2	2.0
5/8"	7.2	6.8	6.0	6.2	5.9	5.2	5.1	4.8	4.2	3.6	3.4	3.0
3/4"	10.	9.7	8.4	8.9	8.4	7.3	7.2	6.9	5.9	5.1	4.9	4.2
7/8"	14.	13.	11.	12.	11.	9.6	9.8	9.3	7.8	6.9	6.6	5.5
1"	18.	17.	14.	15.	15.	12.	13.	12.	10.	9.0	8.5	7.2
1-1/8"	23.	21.	18.	19.	18.	16.	16.	15.	13.	11.	10.	9.0
6x37 CLASSIFICATION												
1-1/4"	26.	24.	21.	23.	21.	18.	19.	17.	15.	13.	12.	10.
1-3/8"	32.	29.	25.	28.	25.	22.	22.	21.	18.	16.	15.	13.
1-1/2"	38.	35.	30.	33.	30.	26.	27.	25.	21.	19.	17.	15.
1-3/4"	51.	47.	41.	44.	41.	35.	36.	33.	29.	26.	24.	20.
2"	66.	61.	53.	57.	53.	46.	47.	43.	37.	33.	30.	26.
2-1/4"	83.	76.	66.	72.	66.	57.	58.	54.	47.	41.	38.	33.

(A) - Socket or Swaged Terminal Attachment.
(B) - Mechanical Sleeve Attachment.
(C) - Hand Tucked Splice Attachment.

TABLE G-4

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE AND WIRE ROPE SLINGS

(In tons of 2000 pounds)

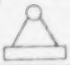
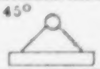
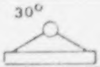
Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4	.55	.51	.49	.41	.38	.37
3/8	1.2	1.1	1.1	.91	.85	.80
1/2	2.1	2.0	1.8	1.6	1.5	1.4
5/8	3.3	3.1	2.8	2.5	2.3	2.1
3/4	4.8	4.4	3.9	3.6	3.3	2.9
7/8	6.4	5.9	5.1	4.8	4.5	3.9
1	8.4	7.7	6.7	6.3	5.8	5.0
1-1/8	10.	9.5	8.4	7.9	7.1	6.3
6x37 CLASSIFICATION						
1-1/4	12.	11.	9.8	9.2	8.3	7.4
1-3/8	15.	13.	12.	11.	10.	8.9
1-1/2	17.	16.	14.	13.	12.	10.
1-3/4	24.	21.	19.	18.	16.	14.
2	31.	28.	25.	23.	21.	18.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-5

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE SLINGS

(In tons of 2000 pounds)

TWO - LEG BRIDLE OR BASKET HITCH												
Rope Dia. Inches	Vertical			60° 			45° 			30° 		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4	1.1	1.0	.99	.95	.88	.85	.77	.73	.70	.55	.51	.49
3/8	2.4	2.2	2.1	2.1	1.9	1.8	1.7	1.6	1.5	1.2	1.1	1.1
1/2	4.3	3.9	3.7	3.7	3.4	3.2	3.0	2.8	2.6	2.1	2.0	1.8
5/8	6.7	6.2	5.6	5.8	5.3	4.8	4.7	4.4	4.0	3.3	3.1	2.8
3/4	9.5	8.8	7.8	8.2	7.6	6.8	6.7	6.2	5.5	4.8	4.4	3.9
7/8	13.	12.	10.	11.	10.	8.9	9.1	8.4	7.3	6.4	5.9	5.1
1	17.	15.	13.	14.	13.	11.	12.	11.	9.4	8.4	7.7	6.7
1-1/8	21.	19.	17.	18.	16.	14.	15.	13.	12.	10.	9.5	8.4
6x37 CLASSIFICATION												
1-1/4	25.	22.	20.	21.	19.	17.	17.	16.	14.	12.	11.	9.8
1-3/8	30.	27.	24.	26.	23.	20.	21.	19.	17.	15.	13.	12.
1-1/2	35.	32.	28.	30.	27.	24.	25.	22.	20.	17.	16.	14.
1-3/4	48.	43.	38.	41.	37.	33.	34.	30.	27.	24.	21.	19.
2	62.	55.	49.	53.	48.	43.	43.	39.	35.	31.	28.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-6—NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel, rope diameter, inches	Number of clips		Minimum spacing, inches
	Drop forged	Other material	
*			
½	3	4	3
⅝	3	4	3¾
¾	4	5	4½
⅞	4	5	5¼
1	4	6	6
1⅛	5	6	6¾
1¼	5	7	7½
1⅜	6	7	8¼
1½	6	8	9

* Three clips shall be used on wire size less than ½-inch diameter.

TABLE G-7
WROUGHT IRON CHAIN
(In pounds or tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
• 1/4	1060	1835	1500	1060
• 5/16	1655	2865	2340	1655
3/8	2385	2.1	3370	2385
• 7/16	3250	2.8	2.3	3250
1/2	2.1	3.7	3.0	2.1
• 9/16	2.7	4.6	3.8	2.7
5/8	3.3	5.7	4.7	3.3
3/4	4.8	8.3	6.7	4.8
7/8	6.5	11.2	9.2	6.5
1	8.5	14.7	12.0	8.5
1-1/8	10.0	17.3	14.2	10.0
1-1/4	12.4	21.4	17.5	12.4
1-3/8	15.0	25.9	21.1	15.0
1-1/2	17.8	30.8	25.2	17.8
1-5/8	20.9	36.2	29.5	20.9
1-3/4	24.2	42.0	34.3	24.2
1-7/8	27.6	47.9	39.1	27.6
2	31.6	54.8	44.8	31.6

• These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8
ALLOY STEEL CHAIN
(In tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
1/4	1.62	2.82	2.27	1.62
3/8	3.30	5.70	4.65	3.30
1/2	5.62	9.75	7.90	5.62
5/8	8.25	14.25	11.65	8.25
3/4	11.5	19.9	16.2	11.5
7/8	14.3	24.9	20.3	14.3
1	19.3	33.5	27.3	19.8
1-1/8	22.2	38.5	31.5	22.2
1-1/4	28.7	49.7	40.5	28.7
1-3/8	33.5	58.0	47.0	33.5
1-1/2	39.7	68.5	56.0	39.7
1-5/8	42.5	73.5	59.5	42.5
1-3/4	47.0	81.5	62.0	47.0

TABLE G-9
MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in fraction of inches
¼(9/32)	3/64
⅜	5/64
½	7/64
⅝	9/64
¾	5/32
⅞	11/64
1	3/16
1⅛	7/32
1¼	¼
1⅜	9/32
1½	5/16
1¾	11/32

TABLE G-10
SAFE WORKING LOADS FOR SHACKLES
[In tons of 2000 pounds]

Material size (inches)	Pin diameter (inches)	Safe working load
½	⅝	1.4
⅝	¾	2.2
¾	⅞	3.2
⅞	1	4.3
1	1⅛	5.6
1⅛	1¼	6.7
1¼	1⅜	8.2
1⅜	1½	10.0
1½	1⅝	11.9
1¾	2	16.2
2	2¼	21.2

TABLE I-1

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operation	Shade No.
Soldering	2
Torch Brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1-6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Light gas welding, up to 1/8 inch	4 or 5
Medium gas welding, 1/8-1/2 inch	5 or 6
Heavy gas welding, over 1/2 inch	6 or 8
Shielded Metal-Arc Welding 1/16- to 5/32-inch electrodes.	10
Inert-gas Metal-Arc Welding (Nonferrous) 1/16- to 5/32-inch electrodes.	11
Inert-gas Metal-Arc Welding (Ferrous) 1/16- to 5/32-inch electrodes.	12
Shielded Metal-Arc Welding:	
3/16- to 1/4-inch electrodes	12
5/16- and 3/8-inch electrodes	14
Atomic Hydrogen Welding	10 to 14
Carbon Arc Welding	14

PART 1916—SHIPBUILDING

SUBPART H—TOOLS AND RELATED EQUIPMENT

1916.71 General precautions.
1916.72 Portable electric tools.
1916.73 Hand tools.
1916.74 Abrasive wheels.
1916.75 Powder actuated fastening tools.
1916.76 Internal combustion engines, other than ship's equipment.

SUBPART H—TOOLS AND RELATED EQUIPMENT

1916.71—GENERAL PRECAUTIONS

(a) Hand lines, slings, tackles of adequate strength, or carriers such as tool bags with shoulder straps, shall be provided and used to handle tools, materials, and equipment so that employees will have their hands free when using ship's ladders and access ladders. The use of hose or electric cords for this purpose is prohibited.

(b) When air tools of the reciprocating type are not in use, the discs and tools shall be removed.

(c) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(d) The moving parts of machinery on dry docks shall be guarded.

(e) Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.

(f) The moving parts of drive mechanisms, such as gearing and belting on large portable tools, shall be adequately guarded.

(g) Headers, manifolds, and widely spaced hose connections on compressed air lines shall bear the word "air" in letters at least 1 inch high, which shall be painted either on the manifold or separate hose connections, or on signs permanently attached to the manifolds or connections. Grouped air connections may be marked in one location.

(h) Before use, compressed air hose shall be examined. Visibly damaged and unsafe hose shall not be used.

1916.72—PORTABLE ELECTRIC TOOLS

(a) The frames of portable electric tools and appliances, except double insulated tools approved by Underwriters' Laboratories, shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(b) Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(c) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.

(d) Worn or frayed electric cables shall not be used.

1916.73—HAND TOOLS

(a) Employers shall not issue or permit the use of unsafe hand tools.

(b) Wrenches, including crescent, pipe, end and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.

(c) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(d) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

1916.74—ABRASIVE WHEELS

(a) Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(b) Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed 1/8 inch from the surface of the wheel.

(c) Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard in accordance with the provisions of the United States of America Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of paragraph (e) of this section, except as follows:

(1) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in paragraph (f) of this section shall be used.

(2) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(d) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of paragraph (f) of this section, except as follows:

(1) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(2) If the wheel is entirely within the work being ground while in use.

(e) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

(f) When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to insure that the pieces of the wheel will be retained in case of accidental breakage shall be used.

(g) All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.

(h) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(i) The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.

(j) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of § 1916.81 (a) and (b), except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

1916.75—POWDER ACTUATED FASTENING TOOLS

(a) General precautions.

(1) Powder actuated fastening tools shall be tested each day before loading to ensure that the safety devices are in proper working condition. Any tool found not to be in proper working order shall be immediately removed from service until repairs are made.

(2) Powder actuated fastening tools shall not be used in an explosive or flammable atmosphere.

(3) All tools shall be used with the type of shield or muzzle guard appropriate for a particular use.

(4) Fasteners shall not be driven into very hard or brittle materials, such as cast iron, glazed tile, surface hardened steel, glass block, live rock, face brick or hollow tile.

(5) Fasteners shall not be driven into soft materials unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the opposite side.

(6) Unless a special guard, fixture or jig is used, fasteners shall not be driven directly into materials such as brick or concrete within 3 inches of the unsupported edge or corner, or into steel surfaces within ½ inch of the unsupported edge or corner. When fastning other material, such as 2 x 4 inch lumber to a concrete surface, fasteners of greater than 7/32-inch shank diameter shall not be used and fasteners shall not be driven within 2 inches of the unsupported edge or corner of the work surface.

(7) Fasteners shall not be driven through existing holes unless a positive guide is used to secure accurate alignment.

(8) No attempt shall be made to drive a fastener into a spalled area caused by an unsatisfactory fastening.

(9) Employees using powder actuated fastening tools shall be protected by eye protection equipment in accordance with the requirements of § 1916.81 (a) and (b).

(b) Instruction of operators.

Before employees are permitted to use powder actuated fastening tools, they shall have been thoroughly instructed by a competent person with respect to the requirements of paragraph (a) of this section and the safe use of such tools as follows:

(1) Before using a tool, the operator shall inspect it to determine that it is clean, that all moving parts operate freely and that the barrel is free from obstructions.

(2) When a tool develops a defect during use, the operator shall immediately cease to use it and shall notify his supervisor.

(3) Tools shall not be loaded until just prior to the intended firing time and the tool shall not be left unattended while loaded.

(4) The tool, whether loaded or empty, shall not be pointed at any person, and hands shall be kept clear of the open barrel end.

(5) In case of a misfire, the operator shall hold the tool in the operating position for at least 15 seconds and shall continue to hold the muzzle against the work surface during disassembly or opening of the tool and removal of the powder load.

(6) Neither tools nor powder charges shall be left unattended in places where they would be available to unauthorized persons.

1916.76—INTERNAL COMBUSTION ENGINES, OTHER THAN SHIP'S EQUIPMENT

(a) When internal combustion engines, furnished by the employer are used in a fixed position below decks, for such purposes as driving pumps, generators, and blowers, the exhaust shall be led to the open air, clear of any ventilation intakes and openings through which it might enter the vessel.

(b) All exhaust line joints and connections shall be checked for tightness immediately upon starting the engine, and any leaks shall be corrected at once.

(c) When internal combustion engines on vehicles, such as forklifts and mobile cranes, or on portable equipment such as fans, generators, and pumps exhaust into the atmosphere below decks, the competent person shall make tests of the carbon monoxide content of the atmosphere as frequently as conditions require to insure that dangerous concentrations do not develop. Employees shall be removed from the compartment involved when the carbon monoxide concentration exceeds 50 parts per million (0.005%). The employer shall use blowers sufficient in size and number and so arranged as to maintain the concentration below this allowable limit before work is resumed.

PART 1916—SHIPBUILDING

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1916.81 Eye protection.
1916.82 Respiratory protection.
1916.83 Head, foot and body protection.
1916.84 Life saving equipment.

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1916.81—EYE PROTECTION

(a) General precautions.

(1) All eye protection equipment required by these regulations shall meet the specifications prescribed by the American Standard Safety Code for Head, Eye and Respiratory Protection Z2.1.

(2) Eye protection equipment shall be maintained in good condition.

(3) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personal spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

(b) Protection against impact.

(1) In any operations such as chipping, caulking, drilling, riveting, grinding, and pouring babbitt metal, in which the eye hazard of flying particles, molten metal, or liquid chemical exists, employees shall be protected by suitable face shields or goggles meeting the requirements of paragraph (a) of this section.

(c) Protection against radiant energy.

(1) In any operation in which the eye hazard of injurious light rays or other radiant energy exists, depending upon the intensity of the radiation to which employees are exposed, they shall be protected by spectacles, cup goggles, helmets, hand shields, or face shields equipped with filter lenses meeting the requirements of paragraphs (a) and (c) (2) of this section.

(2) Filter lenses shall be of a shade number appropriate to the type of work to be performed as indicated in Table I–1 in § 1916.68 except that variations of one or two shade numbers are permissible to suit individual preferences.

(3) If filter lenses are used in the goggles worn under the helmet, the shade number of the lens in the helmet may be reduced so that the sum of the shade numbers of the two lenses will equal the value shown in Table I–1 in § 1916.68.

1916.82—RESPIRATORY PROTECTION

(a) General.

(1) All respiratory protective equipment required by these regulations shall carry the U.S. Bureau of Mines approval for the use for which it is intended. Respiratory protective equipment shall be used only for the purpose intended and no modifications of the equipment shall be made.

(2) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(3) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

(4) Employees required to use respiratory protective equipment approved for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(5) When an air line respirator is used, the air line shall be fitted with a pressure regulating valve and a filter which will remove oil, water, and rust particles. The air intake shall be from a source which is free from all contaminants, such as the exhaust from internal combustion engines.

(6) In all cases, when an employee is stationed outside a compartment, tank or space as a tender or safety man for men working inside in an atmosphere immediately dangerous to life, the tender shall have immediately available for emergency use respiratory protective equipment equivalent to that required for the men in the compartment. When a tender is stationed outside a compartment for men working inside in an atmosphere not immediately dangerous to life, the tender shall wear respiratory protective equipment equivalent to that required for the men in the compartment if he is exposed for prolonged periods to the same concentration of atmospheric contaminants.

(b) Protection in atmospheres immediately dangerous to life.

(1) Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or high concentration of the contaminant, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(2) In atmospheres immediately dangerous to life the only approved types of respiratory protective equipment are the following:

(i) Self-contained breathing apparatus, in which the wearer carries with him a supply of oxygen, air, or an oxygen generating material.

(ii) Hose mask with blower, in which a hand or motor operated blower supplies air at high volume and low pressure through a large diameter hose through which the wearer can draw air in case the blower fails.

(iii) If there is known to be more than 16 percent oxygen and less than 2 percent gas by volume, a gas mask equipped with a canister approved for the particular type gas involved.

(3) Work in atmospheres immediately dangerous to life shall be performed only in an emergency, as when rescuing a man who has been overcome or when shutting off a source of contamination that cannot otherwise be controlled. When an employee enters such an atmosphere he shall be provided with and use an adequate, attended life line.

(4) In the vicinity of each vessel in which there is a danger of employees being exposed to an atmosphere immediately dangerous to life the employer shall have on hand and ready for use respiratory protective equipment approved for such use. When such equipment is required, one or more persons shall be thoroughly trained in the use of the equipment.

(c) Protection against gaseous contaminants not immediately dangerous to life.

(1) Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short

NOTE: A gas mask offers absolutely no protection in an atmosphere deficient in oxygen.

exposures.

(2) When employees are exposed to a gaseous contaminated atmosphere not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the gaseous contaminant as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator in lower concentrations is permissible.

(ii) In concentration of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister. Different canisters are approved for specific use against the following gases or groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide, or combination of the above.

(iii) In low concentrations (less than 0.1 percent by volume), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in subdivision (ii) of this subparagraph.

(d) Protection against particulate contaminants not immediately dangerous to life.

(1) When employees are exposed to unsafe concentrations of particulate contaminants, such as dusts and fumes, mists and fogs or combinations of solids and liquids, they shall be protected by either air line or filter respirators, except as otherwise provided in the regulations of this part.

(2) Filter respirators shall be equipped with the proper type of filter. Different filters are approved for specific protection against groups of contaminants, as follows:

(i) Pneumoconiosis-producing dust and nuisance dust filters which provide respiratory protection against pneumoconiosis-producing dusts, such as aluminum, cellulose, cement, charcoal coal, coke, flour, gypsum, iron ore, limestone and wood.

(ii) Toxic dust filters which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.

(iii) Mist filters which provide respiratory protection against pneumoconiosis-producing mists, chromic acid mists, and nuisance mists.

(iv) Fume filters which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors, such as those from heated metals and other substances).

(v) Filters which provide respiratory protection against combinations of two or more of the contaminants described in subdivisions (i) through (iv) of this subparagraph.

(e) Protection against combinations of gaseous and particulate contaminants not immediately dangerous to life.

(1) When employees are exposed to combinations of gaseous and particulate contaminants not immediately dangerous to life, as in spray painting, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the contaminants, as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator is permissible in lower concentrations.

(ii) In concentrations of gaseous contaminants of less than 2 percent by volume, a canister type gas mask with a combination canister approved for the particular type of gaseous contaminant as specified in paragraph (c)(2) of this section and a filter for the particular type of particulate contaminant as specified in paragraph (d)

(1) of this section.

(iii) In low concentrations of gaseous contaminants (less than 0.1 percent by volume) a respirator equipped with the type of cartridge and filter as specified in subdivision (ii) of this subparagraph.

1916.83—HEAD, FOOT AND BODY PROTECTION

(a) When employees are working in areas where there is danger of falling objects they shall be protected by protective hats.

(b) Protective hats shall meet the specifications contained in the United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1. Hats without dielectric strength shall not be used where there is the possibility of contact with electric conductors.

(c) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

(d) The employer shall arrange through means, such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use. Metal toe caps from which the covering has been worn shall be insulated when employees are working on exposed energized circuits of the vessel's electrical system.

(e) Employees shall not be permitted to wear excessively greasy clothing when performing hot work operations.

(f) Employees shall be protected by suitable gloves when engaged in operations hazardous to their hands.

1916.84—LIFE SAVING EQUIPMENT

(a) Personal flotation devices.

(1) Any personal flotation device shall be approved by the United States Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or their equivalent, pursuant to 46 CFR 160 (Coast Guard Lifesaving Equipment Specifications) and 33 CFR 175.23 (Coast Guard table of devices equivalent to personal flotation devices).

(2) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

[39 F.R. 15124, May 1, 1974.]

(b) Safety belts and lifelines.

(1) Safety belts shall be equipped with lifelines which in use are secured with a minimum of slack to a fixed structure.

(2) Prior to each use, belts and lifelines shall be inspected for dry rot, chemical damage, or other defects which may affect their strength. Defective belts and lifelines shall not be used.

(3) When employees are working in any location requiring a safety belt and a lifeline, care shall be exercised to insure that the lifeline is not cut, pinched, or led over a sharp edge. In hot work operations or those involving the use of acids, solvents, or caustics, the line shall be kept clear to avoid its being burned or weakened. In order to keep the lifeline continuously attached with a minimum of slack to a fixed structure the attachment point of the lifeline shall be appropriately changed as the work progresses.

(c) Life rings and ladders.

(1) At least three 30-inch Coast Guard approved life rings with lines attached shall be kept in easily visible and readily accessible places aboard each vessel afloat on which work is being performed. Life rings shall be located, one forward, one aft, and one on the gangway, except on vessels under 200 feet in length, in which case one at the gangway will be sufficient.

(2) At least one life ring with a line attached shall be located on each staging float alongside a vessel on which work is being performed.

(3) At least 90 feet of line shall be attached to each life ring. Life rings and lines shall be maintained in good condition.

(4) In the vicinity of each vessel afloat on which work is being performed there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event that they fall into the water.

PART 1916—SHIPBUILDING

SUBPART J—SHIP'S MACHINERY AND PIPING SYSTEMS

1916.91 Ship's boilers.
1916.92 Ship's piping systems.
1916.93 Ship's propulsion machinery.
1916.94 Ship's deck machinery.

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SUBPART J—SHIP'S MACHINERY AND PIPING SYSTEMS

1916.91—SHIP'S BOILERS

(a) Before work is performed in the fire, steam, or water spaces of a boiler where employees may be subject to injury from the direct escape of a high temperature medium, such as steam, or water, oil, or other medium at a high temperature entering from an interconnecting system, the employer shall insure that the following steps are taken:

(1) The isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured, blanked, and tagged indicating that employees are working in the boiler. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working in the boiler, or until the work in the boiler is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured, locked, and tagged.

(2) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

(3) A warning sign calling attention to the fact that employees are working in the boilers shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are out of the boilers.

1916.92—SHIP'S PIPING SYSTEMS

(a) Before work is performed on a valve, fitting, or section of piping in a piping system where employees may be subject to injury from the direct escape of steam, or water, oil, or other medium at a high temperature, the employer shall insure that the following steps are taken:

(1) The isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, blanked, and tagged indicating that employees are working on the system. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working on the system, or until the work on the system is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, locked, and tagged.

(2) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

1916.93—SHIP'S PROPULSION MACHINERY

(a) Before work is performed on the main engine, reduction gear, or correcting accessories, the employer shall ensure that the following steps are taken:

(1) The jacking gear shall be engaged to prevent the main engine from turning over. A sign shall be posted at the throttle indicating that the jacking gear is engaged. This sign shall not be removed until the jacking gear can be safely disengaged.

(2) If the jacking gear is steam driven, the stop valves to the jacking gear shall be secured, locked, and tagged indicating that employees are working on the main engine.

(3) If the jacking gear is electrically driven, the circuit controlling the jacking gear shall be deenergized by tripping the circuit breaker, opening the switch or removing the fuse, whichever is appropriate. The breaker, switch, or fuse location shall be tagged indicating that employees are working on the main engine.

(b) Before the jacking engine is operated, the following precautions shall be taken:

(1) A check shall be made to ensure that all employees, equipment, and tools are clear of the engine, reduction gear, and its connecting accessories.

(2) A check shall be made to ensure that all employees, equipment and tools are free of the propeller.

(c) Before work is started on or in the immediate vicinity of the propeller, a warning sign calling attention to the fact that employees are working in that area shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are free of the propeller.

(d) Before the main engine is turned over (e.g., when warming up before departure or testing after an overhaul) a check shall be made to ensure that all employees, equipment, and tools are free of the propeller.

1916.94—SHIP'S DECK MACHINERY

(a) Before work is performed on the anchor windlass or any of its attached accessories, the employer shall ensure that the following steps are taken:

(1) The devil claws shall be made fast to the anchor chains.

(2) The riding pawls shall be in the engaged position.

(3) In the absence of devil claws and riding pawls, the anchor chains shall be secured to a suitable fixed structure of the vessel.

PART 1916—SHIPBUILDING

SUBPART K—PORTABLE, UNFIRED PRESSURE VESSELS, DRUMS, AND CONTAINERS, OTHER THAN SHIP'S EQUIPMENT

1916.101 Portable air receivers and other unfired pressure vessels.
1916.102 Drums and containers.

SUBPART K—PORTABLE, UNFIRED PRESSURE VESSELS, DRUMS, AND CONTAINERS, OTHER THAN SHIP'S EQUIPMENT

1916.101—PORTABLE AIR RECEIVERS AND OTHER UNFIRED PRESSURE VESSELS

(a) Portable, unfired pressure vessels, built after the effective date of this regulation, shall be marked and reported indicating that they have been designed and constructed to meet the standards of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, 1963. They shall be subjected to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(b) Portable, unfired pressure vessels, not built to the code requirements of paragraph (a) of this section, and built prior to the effective date of this regulation, shall be examined quarterly by a competent person. They shall be subjected yearly to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(c) The relief valves on the portable, unfired pressure vessels in paragraphs (a) and (b) of this section shall be set to the safe working pressure of the vessels, or set to the lowest safe working pressure of the systems, whichever is lower.

(d) A record of such examinations and tests made in compliance with the requirements of paragraphs (a) and (b) of this section shall be maintained.

1916.102—DRUMS AND CONTAINERS

(a) Shipping drums and containers shall not be pressurized to remove their contents.

(b) A temporarily assembled pressurized piping system conveying hazardous liquids or gases shall be provided with a relief valve and bypass to prevent rupture of the system and the escape of such hazardous liquids or gases.

(c) Pressure vessels, drums and containers containing toxic or flammable liquids or gases shall not be stored or used where they are subject to open flame, hot metal, or other sources of artificial heat.

(d) Unless pressure vessels, drums and containers of 30-gallon capacity or over containing flammable or toxic liquids or gases are placed in an out-of-the-way area where they will not be subject to physical injury from an outside source, barriers or guards shall be erected to protect them from such physical injury.

(e) Containers of 55 gallons or more capacity containing flammable or toxic liquid shall be surrounded by dikes or pans which enclose a volume equal to at least 25 percent of the total volume of the containers.

(f) Fire extinguishers adequate in number and suitable for the hazard shall be provided. These extinguishers shall be located in the immediate area where pressure vessels, drums, and containers containing flammable liquids or gases are stored or in use. Such extinguishers shall be ready for use at all times.

PART 1916—SHIPBUILDING

SUBPART L—ELECTRICAL MACHINERY

1916.111 Electrical circuits and distribution boards.

SUBPART L—ELECTRICAL MACHINERY

1916.111—ELECTRICAL CIRCUITS AND DISTRIBUTION BOARDS

(a) Before an employee is permitted to work on an electrical circuit, except when the circuit must remain energized for testing and adjusting, the circuit shall be deenergized and checked at the point at which the work is to be done to insure that it is actually deenergized. When testing or adjusting an energized circuit, a rubber mat, duck board, or other suitable insulation shall be used underfoot where an insulated deck does not exist.

(b) Deenergizing the circuit shall be accomplished by opening the circuit breaker, opening the switch, or removing the fuse, whichever method is appropriate. The circuit breaker, switch, or fuse location shall be tagged to indicate that an employee is working on the circuit. Such tags shall not be removed nor the circuit energized until it is definitely determined that the work on the circuit has been completed.

(c) When work is performed immediately adjacent to an open-front energized board or in back of an energized board, the board shall be covered or some other equally safe means shall be used to prevent contact with any of the energized parts.

PART 1917

SAFETY AND HEALTH REGULATIONS FOR SHIPBREAKING

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AUTHORITY: The provisions of this Part 1917 issued under sec. 41, 44 Stat. 1444; sec. 1, 72 Stat. 835; 33 U.S.C. 941.

PART 1917—SHIPBREAKING

SUBPART A—GENERAL PROVISIONS

1917.1 Purpose, scope and responsibility.
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1917.4 [Reserved]
1917.5 Reference specifications, standards, and codes.
1917.6 Notification of accidents resulting in fatalities or serious injuries.
1917.7 Amendment of the regulations of this part.

SUBPART A—GENERAL PROVISIONS

1917.1—PURPOSE, SCOPE AND RESPONSIBILITY

(a) Section 41 of the Longshoremen's and Harbor Workers' Compensation Act requires every employer to furnish and maintain employment and places of employment which are reasonably safe for his employees in all employments covered thereby (the Act applies to all injuries sustained by employees on navigable waters of the United States if the employees are employed by an "employer" as defined in section 2(4) of the Act i.e., "an employer any of whose employees are employed in maritime employment, in whole or in part, upon the navigable waters of the United States (including any dry dock)." Calbeck v. Travelers Insurance Co. and Donovan v. Avondale Shipyards, Inc. (52 S. Ct. 1196 (1962)) and to install, furnish, maintain and use devices and safeguards (with particular reference to equipment used by such employers and working conditions established by them) determined by the Secretary of Labor to be reasonably necessary to protect the life, health and safety of such employees, and to render safe such employment and places of employment and to prevent injury to such employees. The purpose of this part is to make determinations under this standard with respect to shipbreaking activity.

(b) This part does not apply to matters under the control of the United States Coast Guard within the scope of Title 52 of the Revised Statutes and acts supplementary or amendatory thereto (46 U.S.C. secs. 1–1388 passim) including, but not restricted to, the master, ship's officer, crew members, design, construction and maintenance of the vessel, its gear and equipment; to matters within the regulatory authority of the United States Coast Guard to safeguard vessels, harbors, ports and waterfront facilities under the provisions of the Espionage Act of June 17, 1917, as amended (50 U.S.C. 191 et seq.; 22 U.S.C. 401 et seq.); including the provisions of Executive Order 10173, as amended by Executive Orders 10277 and 10352 (3 CFR 1949-1953 Comp., pp. 356, 778 and 873); or to matters within the regulatory authority of the United States Coast Guard with respect to lights, warning devices, safety equipment and other matters relating to the promotion of safety of lives and property under section 4(e) of the Outer Continental Shelf Lands Act (43 U.S.C. 1333). Also, this part does not apply to owners, operators, agents or masters of vessels unless they are acting as "employers." However, this part is not intended to relieve owners, operators, agents or masters of vessels who are not "employers" from responsibilities or duties now placed upon them by law, regulations or custom.

(c) The responsibilities place upon the competent person herein shall be deemed to be the responsibilities of the employer.

1917.2—DEFINITIONS

(a) The term "shall" indicates provisions which are mandatory.

(b) The term "Secretary" means the Secretary of Labor.

(c) The term "employer" means an employer any of whose employees are employed, in whole or in part, in shipbreaking or related employments as defined in paragraphs (i) and (j) of this section on navigable waters of the United States, including dry docks, graving docks and marine railways, and any of whose employees are employed in maritime employment, in whole or in part, upon the navigable waters of the United States, including dry docks, graving docks and marine railways.

(d) The term "employee" means any person employed in shipbreaking or related employments on the navigable waters of the United States, including dry docks, graving docks and marine railways, by an employer as defined in paragraph (c) of this section.

(e) The term "gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel including accommodation ladders, gangplanks and brows.

(f) The term "vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, including special purpose floating structures not primarily designed for or used as a means of transportation on water.

(g) For purposes of § 1917.44, the term "barge" means an unpowered, flat bottom, shallow draft vessel including scows, carfloats and lighters. For purposes of this section, the term does not include shipshaped or deep draft barges.

(h) For purposes of § 1917.44, the term "river tow boat" means a shallow draft, low free board, self-propelled vessel designed to tow river barges by pushing ahead. For purposes of this section, the term does not include other towing vessels.

(i) The term "shipbreaking" means any breaking down of a vessel's structure for the purpose of scrapping the vessel, including the removal of gear, equipment or any component part of a vessel.

(j) The term "related employments" means any employments performed as an incident to or in conjunction with shipbreaking work, including, but not restricted to, inspection, survey and employment as a watchman.

(k) The term "hazardous substance" means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant or otherwise harmful is likely to cause injury.

(l) The term "competent person" for purposes of this part means a person who is capable of recognizing and evaluating employee exposure to hazardous substances or to other unsafe conditions and is capable of specifying the necessary protection and precautions to be taken to ensure the safety of employees as required by the particular regulation under the condition to which it applies. For the purposes of Subparts B and D, the competent person shall be one meeting the requirements of §1917.10.

(m) The term "confined space" means a compartment of small size and limited access such as a double bottom tank, cofferdam or other space which by its small size and confined nature can readily create or aggravate a hazardous exposure.

(n) The term "enclosed space" means any space, other than a confined space, which is enclosed by bulkheads and overhead. It includes cargo holds, tanks, quarters and machinery and boiler spaces.

(o) The term "hot work" means riveting, welding, burning or other fire or spark producing operations.

(p) The term "cold work" means any work which does not involve riveting, welding, burning or other fire or spark producing operations.

(q) The term "powder actuated fastening tool" means a tool or machine which drives a stud, pin or fastener by means of an explosive charge.

(r) For purposes of § 1917.57, the term "hazardous material" means a material which has one or more of the following characteristics:

(1) Has a flash point below 140° F., closed cup, or is subject to spontaneous heating;

(2) Has a threshold limit value below 500 p.p.m. in the case of a gas or vapor, below 500 mg./m.^{3} for fumes, and below 25 m.p.p.c.f. in case of a dust;

(3) Has a single dose oral LD$_{50}$ below 500 mg./kg.;

(4) Is subject to polymerization with the release of large amounts of energy;

(5) Is a strong oxidizing or reducing agent;

(6) Causes first degree burns to skin in short time exposure, or is systemically toxic by skin contact; or

(7) In the course of normal operations, may produce dusts, gases, fumes, vapors, mists, or smokes which have one or more of the above characteristics.

1917.3—PENALTY

1917.3—Deleted
[3 F.R. 5467, March 1, 1973.]

1917.4—[RESERVED]

1917.5—REFERENCE SPECIFICATIONS, STANDARDS, AND CODES

Specifications, standards, and codes of agencies of the U.S. Government, to the extent specified in the text, form a part of the regulations of this part. In addition, under the authority vested in the Secretary under the Act, the specifications, standards, and codes of organizations which are not agencies of the U.S. Government, in effect on the date of the promulgation of the regulations of this part as listed below, to the extent specified in the text, form a part of the regulations of this part:

National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. 02110, Subpart B § 1917.13(b).

Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Ill. 60611, Subpart B, § 1917.12(b) and (f); Subpart H, § 1917.72 (a).

United States of America Standard Safety Code for Portable Wood Ladders, A14.1–1959, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016, Subpart E, § 1917.42(a)(6).

United States of America Standard Safety Code for Portable Metal Ladders, A14.2–1956, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016, Subpart I, § 1917.42(a)(4).

United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1–1959, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016, Subpart I, §§ 1917.81(a)(1), 1917.83(b).

Threshold Limit Values, American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202, Subpart B, § 1917.11 (a) (3) and (b) (3).

1917.6—NOTIFICATION OF ACCIDENTS RESULTING IN FATALITIES OR SERIOUS INJURIES

1917.6—Deleted

[38 F.R. 5467, March 1, 1973.]

1917.7—AMENDMENT OF THE REGULATIONS OF THIS PART

The Secretary may at any time, upon his own motion or upon written petition of any interested person setting forth reasonable grounds therefor, and after opportunity has been given to interested persons to present their views, amend or revoke any of the provisions of the regulations of this part.

PART 1917—SHIPBREAKING

SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1917.10 Competent person.
1917.11 Precautions before entering.
1917.12 Cleaning and other cold work.
1917.13 Certification before hot work is begun.
1917.14 Maintaining gas free conditions.

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SUBPART B—EXPLOSIVE AND OTHER DANGEROUS ATMOSPHERES

1917.10—COMPETENT PERSON

(a) Designation.

(1) For the purposes of Subparts B, D, and H of this part one or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section unless the requirements of Subparts B, D, and H of this part are always carried out by a National Fire Protection Association Certified Marine Chemist.

(2) The employer shall indicate on U.S. Department of Labor Form MAR-8, "Designation of Competent Person" either those employees designated as competent persons or that the prescribed functions of such persons are always carried out by a National Fire Protection Association Certified Marine Chemist in addition to his professional duties. When additions or changes are made in the personnel so designated, a new Form MAR-8 shall be executed. A copy of this executed form shall be forwarded to the nearest office of the Occupational Safety and Health Administration.

(b) Criteria.

The following criteria shall guide the employer in designating employees as competent persons:

(1) Ability to understand the meaning of designations on certificates and of any qualifications relating thereto and to carry out any instructions, either written or oral, left by the National Fire Protection Association Certified Marine Chemist.

(2) Ability to use and interpret the readings of an oxygen indicator and a combustible gas indicator. The ability to use and interpret the readings of a carbon monoxide indicator and a carbon dioxide indicator, if the operations involve such hazardous gases.

(3) Familiarity with and understanding of Subparts B, D, and H of this part.

(4) Familiarity with the structure and knowledge of the location and designation of spaces of the types of vessels on which breaking work is done.

(5) Capability to perform the tests and inspections required by Subparts B, D, and H of this part and to write the required logs.

(c) Logging of inspections and tests.

(1) When tests and inspections required to be performed by a competent person by any provisions of Subparts B, D, and H of this part are made, a record of the locations, operations performed and date, time, and results of the tests and any instructions resulting therefrom shall be recorded on U.S. Department of Labor Form MAR-9, "Log of Inspections and Tests by Competent Person." A separate form shall be used for each vessel on which tests and inspections are made.

(2) This record shall be available for inspection in the immediate vicinity of the affected operations while they are in progress. This record or copy thereof shall be kept on file for a period of at least 3 months from the date of the completion of the job.

(3) A copy of any certificate issued in accordance with § 1917.13 and of any instructions issued by the National Fire Protection Association Certified Marine Chemist shall be kept on file with the log for a period of at least 3 months from the date of the completion of the job.

(d) Application.

The provisions of this section are intended to apply in their entirety to employers engaged in general shipbreaking work where both Subparts B and D of this part are applicable. They do not apply in their entirety to employers whose work involves only certain portions of Subparts B and D of this part, such as the breaking of vessels with no exposure to fuel oil or other flammable hazards. In such cases employers may designate persons who are competent on the basis of the applicable portions of the criteria set forth in paragraph (b) of this section.

1917.11—PRECAUTIONS BEFORE ENTERING

(a) Flammable atmospheres and residues.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in subdivisions (i) and (ii) of this subparagraph, the atmosphere within the space to be entered shall be tested by a competent person to determine the concentration of flammable vapors or gases within the space.

(i) Cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk.

(ii) Spaces immediately adjacent to those described in subdivision (i) of this subparagraph.

(2) If the tests indicate that the atmosphere in the space to be entered contains a concentration of flammable vapor or gas greater than 10 percent of the lower explosive limit, the space shall be ventilated to reduce the concentration below 10 percent of the lower explosive limit before men are permitted to enter.

(3) If the atmosphere in the space to be entered is found to contain a concentration of flammable vapor or gas below the level immediately dangerous to life as defined in § 1917.82(b)(1), but above the threshold limit value, employees shall be protected in accordance with the requirements of § 1917.82 (a), and (c), (d), or (e), whichever is applicable.

(b) Toxic atmospheres and residues.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in subdivisions (i) and (ii) of this subparagraph, the atmosphere in the space to be entered shall be tested for toxic atmospheric contaminants, and the space inspected for the presence of toxic or corrosive residues by a Marine Chemist, Industrial Hygienist or other person qualified to make these tests and inspections.

(i) Cargo spaces or other spaces containing or having last contained bulk liquids, gases, or solids of a toxic, corrosive or irritant nature.

(ii) Spaces immediately adjacent to those described in subdivision (i) of this subparagraph.

(2) If the tests indicate that the atmosphere in the space to be entered contains a concentration of toxic contaminants above the level which is immediately dangerous to life, the space shall be ventilated to reduce the concentration below the level immediately dangerous to life as defined in § 1917.82(b)(1).

(3) If the atmosphere in the space to be entered is found to contain a concentration of toxic contaminants below the level immediately dangerous to life as defined in § 1917.82(b)(1), but above the threshold limit value, employees shall be protected in accordance with the requirements of § 1917.82(a), and (c), (d), or (e), whichever is applicable.

(4) The person qualified to make the tests and inspections referred to in subparagraph (1) of this paragraph shall make a record of the tests, inspections and instructions pertaining to subparagraph (3) of paragraph (a) of this section and subparagraph (2) and (3) of this paragraph on U.S. Department of Labor Form MAR-9, which shall be available for inspection and kept on file in accordance with § 1917.10(c)(2).

(c) Oxygen deficient atmospheres.

(1) Before employees are initially permitted to enter any of the ship's spaces designated in subdivisions (i) through (v) of this subparagraph, the atmosphere in the spaces to be entered shall be tested by a competent person with an oxygen indicator or other suitable device to ensure that it contains at least 16.5 percent oxygen.

(i) Spaces in which the tests required by paragraphs (a) and (b) of this section indicate that no flammable or toxic contaminants are present in the atmosphere.

(ii) Compartments which have been sealed.

(iii) Spaces which have been coated and closed up.

(iv) Nonventilated compartments which have been freshly painted.

(v) Cargo spaces containing cargoes or residues of cargoes which absorb oxygen, such as scrap iron, fresh fruit and molasses, and various vegetable drying oils in bulk.

(2) If the tests indicate that the atmosphere in the space to be entered contains less than 16.5 percent oxygen, the space shall be ventilated until tests indicate an oxygen content above this level.

(d) Exceptions.

In emergencies and in cases of work of brief duration necessary to accomplish the ventilation required or to start operations, work may be performed in atmospheres containing concentrations of flammable contaminants above the upper explosive limit or otherwise immediately dangerous to life, provided employees are protected in accordance with the requirements of § 1917.82 (a) and (b).

1917.12—CLEANING AND OTHER COLD WORK

(a) Employees shall be permitted to remove residue materials or to perform other cold work in spaces described in § 1917.11(a)(1)(i) and (ii), and (b)(1)(i) and (ii) only under the following conditions:

(1) Liquid residues of flammable and toxic materials shall be removed from the spaces as thoroughly as practicable before employees start actual cleaning operations in these spaces. Drippings and spills of these materials on deck or elsewhere alongside the vessel shall be cleaned up as the work progresses. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel.

(2) Continuous natural or mechanical ventilation shall be provided to keep the concentration of flammable vapors below ten (10) percent of the lower explosive limit in all parts of the space, provided that if, because of the high volatility of the residues, a uniform concentration of less than ten (10) percent of the lower explosive limit cannot be achieved, sufficient exhaust ventilation shall be provided to reduce the concentration to or below that level in the major portions of the compartment.

(3) Tests shall be made by a competent person prior to commencement of cold work and with sufficient frequency thereafter, in accordance with temperature, volatility of the residues and other existing conditions in and about the spaces to ensure that the concentration stated in subparagraph (2) of this paragraph is not exceeded.

(4) Cold work only shall be permitted.

(5) Tests shall be made by a competent person to ensure that the exhaust vapors from these spaces are not accumulating in other areas within or around the vessel, marine railway, dry dock, or under the pier where source of ignition may be present. Should such accumulations be found, any sources of ignition within the affected area shall be removed or extinguished.

(b) Only approved explosion-proof, self-contained, battery-fed, portable lamps shall be used in spaces described in paragraph (b) of § 1917.13 before the spaces have been certified as "Safe for Men." Battery-fed, portable lamps bearing the approval of the Underwriters' Laboratories for use in Class I, Group D Atmospheres, or approved as permissible by the U.S. Bureau of Mines, and such lamps listed by the U.S. Coast Guard as approved for such use are deemed to meet the requirements of this paragraph.

(c) Signs shall be posted on the open deck adjacent to the access to spaces described in paragraph (b) of § 1917.13 prohibiting smoking and the use of open flames.

(d) The metallic parts of air moving devices, including fans, blowers, and jet-type air movers, and all duct work shall be electrically bonded to the vessel's structure.

(e) All motors and control equipment shall be of the explosion-proof type. Fans shall have nonferrous blades. Portable air ducts shall also be of nonferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(f) In spaces described in paragraph (b) of § 1917.13 which have been certified "Safe for Men," either battery lamps or explosion-proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard, shall be used, provided the lights are mounted to the space openings from the exterior, or suspended within the space with the cables so led as to protect them from injury.

(g) In spaces certified "Safe for Fire" nonexplosion proof lights may be used.

1917.13—CERTIFICATION BEFORE HOT WORK IS BEGUN

(a) Hot work in the open.

Before hot work is performed from open decks or in tanks or compartments from which the overhead has been completely removed, on the boundaries of cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk, the following steps shall be taken:

(1) Tests shall be made by a competent person to determine the concentration of flammable vapors in these spaces. The permissible level of concentration of flammable vapors shall not exceed ten (10) percent of the lower explosive limit in all parts of the spaces.

(2) When the tests indicate that a space contains a concentration of flammable vapors above the permissible concentration, the space shall be inerted with a nonflammable gas or with water, or sufficient ventilation shall be provided to reduce the concentration below the permissible level.

(3) When the bottom of a space contains flammable residues, it shall be flooded with water to cover all parts of the space to a depth of at least one (1) foot unless the space is inerted.

(b) Hot work below decks.

Employees shall not be permitted to engage in hot work in or on the following spaces, boundaries or pipelines until a certificate setting forth that the hot work can be done in safety is issued. Such certificate shall be acceptable only if issued by a Marine Chemist certificated by the National Fire Protection Association.

(1) On tank vessels:

(i) Within or on the boundaries of cargo tanks which have been used to carry combustible or flammable liquids and gases in bulk, or within spaces adjacent to such cargo tanks.

(ii) Within or on the boundaries of fuel tanks.

(iii) On pipelines, heating coils, pumps, fittings, or other appurtenances corrected to such cargo or fuel tanks.

(2) On dry cargo, miscellaneous, and passenger vessels:

(i) Within or on the boundaries of cargo tanks which have been used to carry combustible or flammable liquids and gases in bulk.

(ii) Within spaces adjacent to cargo tanks which have been used to carry flammable gases, or liquids with a flash point below 150° F., except where the distance between such cargo tanks and the work to be performed is not less than twenty-five (25) feet.

(iii) Within or on the boundaries of fuel tanks.

(iv) On pipelines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(3) In dry cargo holds for which a Marine Chemist's certificate is not required by paragraph (b)(2)(ii) of this section, hot work may be performed only after a competent person has carefully examined the hold and found it to be free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

(4) Before hot work is performed in engine room and boiler room spaces of any vessel for which a Marine Chemist's certificate is not required by the provision of paragraph (b)(1) and (2) of this section or in fuel tank and engine compartments of boats, the bilges shall be inspected and tested by a competent person to ensure that they are free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

1917.14—MAINTAINING GAS FREE CONDITIONS

(a) Hot work in the open.

(1) During the performance of hot work from open decks or in tanks or compartments from which the overhead has been completely removed, on the boundaries of spaces described in § 1917.13(a), other than those filled with water, the competent person shall make frequent tests to ensure that the inert atmosphere is being maintained or that the concentration of flammable vapors remains below ten (10) percent of the lower explosive limit.

(b) Hot work below decks.

(1) When conditions in spaces below decks described in § 1917.13(b) (1) and (2) are such that there is a possibility of hazardous vapors being released from residues or other sources, after a Marine Chemist's certificate has been issued, a competent person shall make tests to ensure that the gas free condition is maintained irrespective of whether hot work is being performed in or on the aforementioned spaces. When the competent person finds that the atmospheric conditions have altered, work shall be stopped and a new Marine Chemist's certificate in accordance with § 1917.13(b) (1) and (2) shall be obtained, before work is resumed.

PART 1917—SHIPBREAKING

SUBPART C—[RESERVED]

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PART 1917—SHIPBREAKING

SUBPART D—WELDING, CUTTING AND HEATING

1917.31 Ventilation and protection in welding, cutting, and heating.
1917.32 Fire prevention.
1917.33 Welding, cutting and heating in way of preservative coatings.
1917.34 Welding, cutting and heating of hollow metal containers and structures not covered by § 1917.11.
1917.35 Gas welding and cutting.
1917.36 Arc welding and cutting.

SUBPART D—WELDING, CUTTING AND HEATING

1917.31—VENTILATION AND PROTECTION IN WELDING, CUTTING AND HEATING

(a) Mechnical ventilation; requirements.

(1) For purposes of this section, mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

(b) Welding, cutting and heating in confined spaces.

(1) Except as provided in subparagraph (3) of this paragraph and paragraph (c)(2) of this section, either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

(2) The means of access shall be provided to a confined space in accordance with § 1917.46 (b) (1) and (2).

(3) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of § 1917.82(a), and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(c) Welding, cutting or heating of metals of toxic significance.

(1) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section.

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals.

(iii) Cadmium-bearing filler materials.

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(2) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subparagraph shall be performed with local exhaust ventilation in accordance with the requirements of paragraph (a) of this section or employees shall be protected by air line respirators in accordance with the requirements of § 1917.82(a).

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.

(ii) Cadmium-bearing or cadmium coated base metals.

(iii) Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(3) Employees performing such operations in the open air shall be protected by filter type respirators in accordance with requirements of paragraphs (a) and (d) (2)(iv) of § 1917.82, except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of § 1917.82(a).

(4) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(d) General welding, cutting and heating.

(1) Welding, cutting and heating not involving conditions or materials described in paragraph (b) or (c) of this section may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechancial ventilation or respiratory protective equipment shall be provided.

(2) Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of § 1503.81 (a) and (c).

1917.32—FIRE PREVENTION

(a) When hot work is performed below decks or in other situations in which accidental fire would jeopardize the safety of employees the following precautions shall be taken:

(1) When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place.

(2) If the object to be welded, cut or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks and slag, and to protect the immovable fire hazards from them.

(3) When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(4) In order to eliminate the possibility of fire in confined spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the confined space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch hour. Overnight and at the change of shifts the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from confined spaces when they are disconnected from the torch or other gas consuming device.

(b) In all cases, suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. Personnel assigned to contain fires within controllable limits shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used.

1917.33—WELDING, CUTTING AND HEATING IN WAY OF PRESERVATIVE COATINGS

(a) Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

(b) When coatings are determined to be highly flammable either they shall be stripped from the area to be heated to prevent ignition or they shall be burned away under controlled conditions. A 1½-inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.

(c) Protection against toxic preservative coatings.

(1) In enclosed spaces all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application or the employees shall be protected by air line respirators meeting the requirements of § 1917.82(a).

(2) In the open air, employees shall be protected by a filter type respirator in accordance with requirements of § 1917.82 (a) and (d).

1917.34—WELDING, CUTTING AND HEATING OF HOLLOW METAL CONTAINERS AND STRUCTURES NOT COVERED BY § 1917.11

(a) Drums, containers or hollow structures which have contained flammable substances shall, before welding, cutting or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

(b) Before heat is applied to a drum, container or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

(c) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

(d) Objects such as those listed in paragraph (c) of this section shall also be inspected to determine whether water or other nonflammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled or otherwise made safe during the application of heat.

(e) Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure which may build up during the application of heat.

1917.35—GAS WELDING AND CUTTING

(a) Transporting, moving and storing compressed gas cylinders.

(1) Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.

(2) When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings.

(3) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck or permitted to strike each other violently.

(4) When cylinders are transported by vehicle, they shall be secured in position.

(5) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(6) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(7) A suitable cylinder truck, chain or other steadying device shall be used to keep cylinders from being knocked over while in use.

(8) When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valves shall be closed.

(9) Acetylene cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

(b) Placing cylinders.

(1) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(2) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(3) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal or other sources of artificial heat.

(4) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(c) Treatment of cylinders.

(1) Cylinders, whether full or empty, shall not be used as rollers or supports.

(2) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.

(3) No damaged or defective cylinder shall be used.

(d) Use of fuel gas.

The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(1) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.

(2) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1½ turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(3) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(4) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(5) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the vessel.

(6) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

(e) Fuel gas and oxygen manifolds.

(1) Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(2) Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces.

(3) Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.

(4) When not in use, manifold and header hose connections shall be capped.

(5) Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

(f) Hose.

(1) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used.

(2) When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 8 inches shall be covered by tape.

(3) All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service.

(4) Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred (200) psi. Defective hose or hose in doubtful condition shall not be used.

(5) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(6) Boxes used for the stowage of gas hose shall be ventilated.

(g) Torches.

(1) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose.

(2) Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

(3) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

(h) Pressure regulators.

Oxygen and fuel gas regulators including their related gauges shall be in proper working order while in use.

1917.36—ARC WELDING AND CUTTING

(a) Manual electrode holders.

(1) Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used.

(2) Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

(b) Welding cables and connectors.

(1) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

(2) Only cable free from repair or splices for a minimum distance of ten (10) feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(3) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(4) Cables in poor repair shall not be used. When a cable, other than the cable lead referred to in subparagraph (2) of this paragraph, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

(c) Ground returns and machine grounding.

(1) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(2) Structures or pipe lines, except pipe lines containing gases or flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by subparagraph (1) of this paragraph.

(3) When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.

(4) When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no conditions of electrolysis or fire hazard exists by virtue of such use.

(5) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(6) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(d) Operating instructions.

Employers shall instruct employees in the safe means of arc welding and cutting as follows:

(1) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(2) Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.

(3) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.

(4) Any faulty or defective equipment shall be reported to the supervisor.

(e) Shielding.

Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

PART 1917—SHIPBREAKING

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1917.41 Scaffolds or staging.
1917.42 Ladders.
1917.43 [Reserved]
1917.44 Access to vessels.
1917.45 Access to and guarding of dry docks and marine railways.
1917.46 Access to cargo and confined spaces.
1917.47 Working surfaces.

SUBPART E—SCAFFOLDS, LADDERS AND OTHER WORKING SURFACES

1917.41—SCAFFOLDS OR STAGING

(a) General requirements.

(1) All scaffolds and their supports, whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four (4).

(2) All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine or short fiber lumber is prohibited.

(3) Lumber dimensions as given in this subpart are nominal except where given in fractions of an inch.

(4) All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.

(5) Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.

(6) Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms.

(7) No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

(b) Horse scaffolds.

(1) The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E-1 in § 1917.68.

(2) Horses constructed of materials other than lumber shall provide the strength, rigidity, and security required of horses constructed of lumber.

(3) The lateral spread of the legs shall be equal to not less than one-third of the height of the horse.

(4) All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure.

(5) Platform planking shall be in accordance with the requirements of paragraph (d) of this section.

(6) Backrails and toeboards shall be in accordance with paragraph (e) of this section.

(c) Other types of scaffolds.

(1) Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of paragraphs (a), (d), and (e) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

(d) Scaffold or platform planking.

(1) Platform planking shall be of not less than 2 x 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

(2) Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

(3) Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members.

(4) Table E-2 in § 1917.68 shall be used as a guide in determining safe loads for scaffold planks.

(e) Backrails and toeboards.

(1) Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway.

(2) Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fiber rope rails shall not be used.

(3) Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted employees working more than 5 feet above solid surfaces shall be protected by safety belts and lifelines meeting the requirements of § 1917.84(b), and employees working over water shall be protected by buoyant work vests meeting the requirements of § 1503.84(a).

(4) Employees working from scaffolds on floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail.

(5) When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 x 4 inch lumber shall be provided.

(f) Access to staging.

(1) Access to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements of § 1917.42 or rigid type noncollapsible trestles with parallel and level rungs.

(2) Ramps and stairways shall be provided with 36-inch handrails with midrails.

(3) Ladders shall be so located or other means shall be taken so that it is not necessary for employers to step more than one foot from the ladder to any intermediate landing or platform.

(4) Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

(5) Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements of § 1917.42 or a Jacob's ladder properly secured, meeting the requirements of § 1917.44(d).

1917.42—LADDERS

(a) General requirements.

(1) The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs.

(2) When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of side rails for their total length shall be those specified in paragraph (b) or (c) of this section.

(3) Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed.

(4) Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Metal Ladders, A14.2.

(5) Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations.

(6) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Wood Ladders, A14.1.

(b) Construction of portable wood cleated ladders up to 30 feet in length.

(1) Wood side rails shall be made from West Coast hemlock, Eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low density woods is prohibited.

(2) Side rails shall be dressed on all sides, and kept free of splinters.

(3) All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than ½ inch in diameter or within ½ inch of the edge of the rail or nearer than 3 inches to a tread or rung.

(4) Pitch pockets not exceeding ⅛ inch in width, 2 inches in length and ½ inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

(5) The width between side rails at the base shall be not less than 11½ inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least ¼ inch for each additional 2 feet of length.

(6) Side rails shall be at least 1⅝ x 3⅝ inches in cross section.

(7) Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails ½ inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

(8) Cleats 20 inches or less in length shall be at least $^{25}/_{32}$ x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least $^{25}/_{32}$ x 3¾ inches in cross section.

(c) Construction of portable wood cleated ladders from 30 to 60 feet in length.

(1) Ladders from 30 to 60 feet in length shall be in accordance with the specifications of paragraph (b) of this section with the following exceptions:

(i) Rails shall be of not less than 2 x 6 inch lumber.

(ii) Cleats shall be of not less than 1 x 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fastenings of equivalent strength.

1917.43—[RESERVED]

1917.44—ACCESS TO VESSELS

(a) Access to vessels afloat.

The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(1) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and safely secured, shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping, shall be provided. In an emergency, a Jacob's ladder meeting the requirements of paragraph (d) (1) and (2) of this section may be used.

(2) Each side of such gangway, and the turn table if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with a midrail. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(3) The gangway shall be kept properly trimmed at all times.

(4) When a fixed tread accommodation ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(5) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(6) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with midrails on both sides.

(7) Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(8) When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(9) Obstructions shall not be laid on or across the gangway.

(10) The means of access shall be adequately illuminated for its full length.

(11) Loads shall not be passed over the means of access while employees are on it.

(b) Access to vessels in drydock or between vessels.

Gangways meeting the requirements of paragraph (a) (1), (2), (8), (9) and (10) of this section shall be provided for access from wing wall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, from one vessel to another.

(c) Access to barges and river towboats.

(1) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained and properly secured.

(2) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of subparagraph (1) of this paragraph or a safe walkway in accordance with the requirements of paragraph (a)(6) of this section shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping, shall be provided. In an emergency, a Jacob's ladder in accordance with the requirements of paragraph (d) of this section may be used.

(3) The means of access shall be in accordance with the requirements of paragraph (a) (8), (9) and (10) of this section.

(d) Jacob's ladders.

(1) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(2) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

1917.45—ACCESS TO AND GUARDING OF DRY DOCKS AND MARINE RAILWAYS

(a) A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead.

(b) Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a midrail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(c) Railings meeting the requirements of paragraph (b) of this section shall be provided on the means of access to and from the floors of graving docks.

(d) Railings approximately 42 inches in height, with a midrail, shall be provided on the edges of wing walls of floating dry docks and on the edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering the dock.

(e) When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42-inch railings with a mid rail. When such a railing would be impracticable or ineffective, other effective means shall be provided to prevent men from falling into the water.

(f) Access to wingwalls from floors of dry docks shall be by ramps, permanent stairways or ladders meeting the applicable requirements of § 1917.42.

(g) Catwalks on stiles of marine railways shall be no less than 20 inches wide and shall have on at least one side a guardrail and midrail meeting the requirements of § 1917.41(e) (1) and (2).

1917.46—ACCESS TO CARGO AND CONFINED SPACES

(a) Cargo spaces.

(1) There shall be at least one safe and accessible ladder in any cargo space which employees must enter.

(2) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(3) Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of subparagraph (1) of this paragraph. In an emergency, a Jacob's ladder meeting the requirements of § 1917.44(d) may be used.

(4) Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that equipment, materials, scrap or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or crane signalman of his intention.

(b) Confined spaces.

(1) More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere.

(2) When the ventilating ducts required by these regulations must pass through these means of access, an additional means of access shall be provided.

1917.47—WORKING SURFACES

When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting the requirements of § 1917.84(a).

[39 F.R. 15124, May 1, 1974.]

PART 1917—SHIPBREAKING

SUBPART F—GENERAL WORKING CONDITIONS

1917.51 Housekeeping.
1917.52 Illumination.
1917.53 Utilities.
1917.54 Work in confined or isolated spaces.
1917.55 [Reserved]
1917.56 Work in or on lifeboats.
1917.57 Health and sanitation.
1917.58 First aid.
1917.59 Commercial diving operations.

SUBPART F—GENERAL WORKING CONDITIONS

1917.51—HOUSEKEEPING

(a) All working areas on or immediately surrounding the vessel in a dry dock and graving dock or on a marine railway shall be kept in a reasonable state of order. Scrap, equipment and other materials shall be so piled as not to present a hazard to employees.

(b) Adequate aisles and passageways shall be maintained, as far as practicable, in all work areas, except when impossible due to the nature of the work being performed.

(c) Free access shall be maintained at all times to all exits and to fire-extinguishing equipment.

1917.52—ILLUMINATION

(a) All means of access and walkways leading to working areas as well as the working areas themselves shall be adequately illuminated.

(b) Temporary lights shall meet the following requirements:

(1) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(2) Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Splices which have insulation equal to that of the cables are permitted.

(3) Cords shall be kept clear of working spaces and walkways or other locations in which they are readily exposed to damage.

(c) Exposed non-current-carrying metal parts of temporary lights furnished by the employer shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current. Grounding shall be in accordance with the requirements of § 1917.72(b).

(d) Where temporary lighting from sources outside the vessel is the only means of illumination, portable emergency lighting equipment shall be available to provide illumination for safe movement of employees.

(e) Employees shall not be permitted to enter dark spaces without a suitable portable light. The use of matches and open flame lights is prohibited. In non-gas free spaces, portable lights shall meet the requirements of § 1917.12 (b).

(f) Temporary lighting stringers or streamers shall be so arranged as to avoid overloading of branch circuits. Each branch circuit shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

1917.53—UTILITIES

(a) Steam supply and hoses.

(1) Prior to supplying a vessel with steam from a source outside the vessel, the employer shall ascertain the safe working pressure of the vessel's steam system. The employer shall install a pressure gauge and a relief valve of proper size and capacity at the point where the temporary steam hose joins the vessel's steam piping system or systems. The relief valve shall be set and capable of relieving at a pressure not exceeding the safe working pressure of the vessel's system in its present condition, and there shall be no means of isolating the relief valve from the system which it protects. The pressure gauge and relief valve shall be located so as to be visible and readily accessible.

(2) Steam hose fittings shall have a safety factor of not less than (5).

(3) When steam hose is hung in a bight or bights, the weight shall be relieved by appropriate lines. The hose shall be protected against chafing.

(4) Steam hose shall be protected from damage and hose and temporary piping shall be so shielded where passing through normal work areas as to prevent accidental contact by employees.

(b) Electric power.

(1) When the vessel is supplied with electric power from a source outside the vessel, the following precautions shall be taken prior to energizing the vessel's circuits:

(i) If in dry dock, the vessel shall be adequately grounded.

(ii) The employer shall ensure that all circuits to be energized are in a safe condition.

(iii) All circuits to be energized shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

1917.54—WORK IN CONFINED OR ISOLATED SPACES

When any work is performed in a confined space, except as provided in § 1917.31(b)(3), or when an employee is working alone in an isolated location, frequent checks shall be made to ensure the safety of the employees.

1917.55—[RESERVED]

1917.56—WORK IN OR ON LIFEBOATS

(a) Before employees are permitted to work in or on a lifeboat, either stowed or in a suspended position, the employer shall ensure that the boat is secured independently of the releasing gear to prevent the boat from falling due to accidental tripping of the releasing gear and movements of the davits or capsizing of a boat in chocks.

(b) Employees shall not be permitted to work on the outboard side of lifeboats stowed on their chocks unless the boats are secured by gripes or otherwise secured to prevent them from swinging outboard.

1917.57—HEALTH AND SANITATION

(a) No chemical product, such as a solvent or preservative; no structural material, such as cadmium or zinc coated steel, or plastic material; and no process material, such as welding filler metal; which is a hazardous material within the meaning of § 1917.2(r), shall be used until the employer has ascertained the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling, application, or utilization of such a material.

(b) In order to ascertain the hazards, as required by paragraph (a) of this section, the employer shall obtain the following items of information which are applicable to a specific product or material to be used:

(1) The name, address, and telephone number of the source of the information specified in this paragraph, preferably those of the manufacturer of the product or material.

(2) The trade name and synonyms for a mixture of chemicals, a basic structural material, or for a process material; and the chemical name and synonyms, chemical family, and formula for a single chemical.

(3) Chemical names of hazardous ingredients, including, but not limited to, those in mixtures, such as those in:

(i) Paints, preservatives, and solvents;

(ii) Alloys, metallic coatings, filler metals and their coatings or core fluxes; and

(iii) Other liquids, solids, or gases (e.g., abrasive materials).

(4) An indication of the percentage, by weight or volume, which each ingredient of a mixture bears to the whole mixture, and of the threshold limit value of each ingredient, in appropriate units.

(5) Physical data about a single chemical or a mixture of chemicals, including boiling point, in degrees Fahrenheit; vapor pressure, in millimeters of mercury; vapor density of gas or vapor (air = 1); solubility in water, in percent by weight; specific gravity of material (water = 1); percentage volatile, by volume, at 70° F.; evaporation rate for liquids (either butyl acetate or ether may be taken as 1); and appearance and odor.

(6) Fire and explosion hazard data about a single chemical or a mixture of chemicals, including flash point, in degrees Fahrenheit; flammable limits, in percent by volume in air; suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information.

(7) Health hazard data, including threshold limit value, in appropriate units, for a single hazardous chemical or for the individual hazardous ingredients of a mixture, as appropriate; effects of overexposure, and emergency and first aid procedures.

(8) Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization.

(9) Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled.

(10) Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and of ventilation, such as local exhaust, general, special, or other types.

(11) Special precautionary information about handling and storing.

(12) Any other general precautionary information.

(c) The pertinent information required by paragraph (b) of this section shall be recorded either on U.S. Department of Labor Form LSB 00S–4, Material Safety Data Sheet, or on an essentially similar form which has been approved by the Occupational Safety and Health Administration. Copies of Form LSB 00S-4 may be obtained at any of the following regional offices of the Occupational Safety and Health Administration:

(1) North Atlantic Region, 341 Ninth Avenue, Room 920, New York, N.Y. 10001 (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont).

(2) Middle Atlantic Region, Penn Square Building, Juniper and Filbert Streets, Philadelphia, Pa. 19107 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia).

(3) South Atlantic Region, 1371 Peachtree Street NE., Suite 723, Atlanta, Ga. 30309 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee).

(4) Great Lakes Region, 848 Federal Office Building, 219 South Dearborn Street, Chicago, Ill. 60604 (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin).

(5) Mid-Western Region, 2100 Federal Office Building, 911 Walnut Street, Kansas City, Mo. 64106 (Colorado, Iowa, Kansas, Missouri, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming).

(6) Western Gulf Region, 411 North Akard Street, Room 601, Dallas, Tex. 75201 (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas).

(7) Pacific Region, 10353 Federal Building, 450 Golden Gate Avenue, Box 36017, San Francisco, Calif. 94102 (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington).

A completed form shall be preserved and available for inspection for a period of 3 months from the date of the completion of the job.

(d) The employer shall instruct employees who will be exposed to the hazardous materials as to the nature of the hazards and the means of avoiding them.

(e) The employer shall provide all necessary controls, and the employees shall be protected by suitable personal protective equipment against the hazards identified under paragraph (a) of this section and those hazards for which specific precautions are required in Subparts B and D of this part.

(f) The employer shall provide adequate washing facilities for employees engaged in the various shipbreaking operations where contaminants can, by ingestion or absorption, be detrimental to the health of the employees. The employer shall encourage good personal hygiene practices by informing the employees of the need for removing surface contaminants by thorough washing of hands and face prior to eating or smoking.

(g) The employer shall not permit eating or smoking in the immediate areas where shipbreaking operations produce atmospheric contaminants.

(h) No minor under 18 years of age shall be employed in shipbreaking or related employments.

1917.58—FIRST AID

(a) Unless a first aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close at hand, shall be qualified to administer first aid to the injured.

(b) The first aid kit shall consist of a weatherproof container with individually sealed packages for each type of item. The contents of such kit shall contain a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch and 2 inch.
Gauze compress bandages, 4 inch.
Adhesive bandages, 1 inch.
Triangular bandages, 40 inch.
Ammonia inhalants and ampules.
Antiseptic applicators or swabs.
Burn dressing.
Eye dressing.
Wire or thin board splints.
Forceps and tourniquet.

(c) The contents of the first aid kit shall be checked before being sent out on each job, and at least weekly on each job, to ensure that the expended items are replaced.

(d) There shall be available for each vessel one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that no more than two stretchers are required on each job location. A blanket or other liner suitable for transferring patients to and from the stretcher shall be provided. Stretchers shall be kept close to the vessels. This paragraph does not apply where ambulance services which are available are known to carry such stretchers.

1917.59 Commercial diving operations.

Commercial diving operations shall be subject to Subpart T of Part 1910, §§ 1910.401–1910.441, of this Chapter.

[42 F.R. 37673, July 22, 1977.]

PART 1917—SHIPBREAKING

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1917.61 Inspection.
1917.62 Ropes, chains and slings.
1917.63 Shackles and hooks.
1917.64 Chain falls and pull-lifts.
1917.65 Hoisting and hauling equipment.
1917.66 Use of gear.
1917.67 Qualifications of operators.
1917.68 Tables.

SUBPART G—GEAR AND EQUIPMENT FOR RIGGING AND MATERIALS HANDLING

1917.61—INSPECTION

(a) All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each shift and, when necessary, at intervals during its use to ensure that it is safe. Defective gear shall be removed and repaired or replaced before further use.

(b) The safe working load of gear as specified in §§ 1917.62 and 1917.63 shall not be exceeded.

1917.62—ROPES, CHAINS AND SLINGS

(a) Manila rope and manila rope slings.

Table G–1 in § 1917.68 shall be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Wire rope and wire rope slings.

(1) Tables G–2 through G–5 in § 1917.68 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five (5) is maintained.

(2) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(3) Where U-bolt wire rope clips are used to form eyes, Table G–6 in § 1917.68 shall be used to determine the number and spacing of clips. The U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(4) Wire rope shall not be secured by knots.

(c) Chains and chain slings.

(1) Tables G–7 and G–8 in § 1917.68 shall be used to determine the working load limit or various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products.

(2) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(3) Interlink wear, not accompanied by stretch in excess of 5 percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G–9 § 1917.68, has been reached.

(4) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(5) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in paragraph (d) of this section shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(6) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.

(7) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

1917.63—SHACKLES AND HOOKS

(a) Shackles.

(1) Table G-10 in § 1917.68 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Hooks.

(1) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(2) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(3) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

1917.64—CHAIN FALLS AND PULL-LIFTS

(a) Chain falls and pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.

(b) Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.

(c) Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear. The upper hook shall be moused or otherwise secured against coming free of its support.

(d) Scaffolding shall not be used as a point of attachment for lifting devices, such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

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1917.65—HOISTING AND HAULING EQUIPMENT

(a) Derrick and crane certification:

(1) Derricks and cranes which are part of, or regularly placed aboard, barges, other vessels, or on wingwalls of floating drydocks, and are used to transfer materials or equipment from or to a vessel or drydock, shall be tested and certificated in accordance with the standards provided in Part 1919 of this chapter by persons accredited for that purpose.

(2) Subparagraph (1) of this paragraph shall take effect 180 days after the effective date of this amendment.

(b) The moving parts of hoisting and hauling equipment shall be guarded.

(c) Mobile crawler or truck cranes used on a vessel:

(1) The maximum manufacturer's rated safe working loads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers shall be conspicuously posted near the controls and shall be visible to the operator. A radius indicator shall be provided.

(2) The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.

(d) Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane either permanently or temporarily mounted, shall be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

(e) Marine railways:

(1) The cradle or carriage on the marine railway shall be positively blocked or secured when in the hauled position to prevent it from being accidentally released.

1917.66—USE OF GEAR

(a) Loads shall be safely rigged before being hoisted.

(b) When slings are secured to eyebolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.

(c) Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.

(d) Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.

(e) Loose ends of idle legs of slings in use shall be hung on the hook.

(f) Employees shall not be permitted to ride the hook or the load.

(g) Loads (tools, equipment or other materials) shall not be swung or suspended over the heads of employees.

(h) Pieces of equipment or structure susceptible to falling or dislodgement shall be secured or removed as early as possible.

(i) An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.

(j) Pallets, when used, shall be of such material and construction and so maintained as to safely support and carry the loads being handled on them.

(k) Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning shall be given to employees in the vicinity of such operations.

(l) At no time shall an employee be permitted to place himself in a hazardous position between a swinging load and a fixed object.

(m) A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, shall be completely opened. The beam or pontoon left in place adjacent to an opening shall be sufficiently lashed, locked or otherwise secured to prevent it from being unshipped.

(n) Hatches shall not be opened or closed while employees are in the square of the hatch below.

1917.67—QUALIFICATIONS OF OPERATORS

(a) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

(b) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailment which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.

1917.68—TABLES

TABLE E-1

SPECIFICATIONS FOR THE CONSTRUCTION OF HORSES

Structural members	Height in feet		
	Up to 10	10 to 16	16 to 20
	Inches	*Inches*	*Inches*
Legs	2 x 4	3 x 4	4 x 6
Bearers or headers	2 x 6	2 x 8	4 x 6
Crossbraces	2 x 4 or 1 x 8	2 x 4	2 x 6
Longitudinal braces	2 x 4	2 x 6	2 x 6

TABLE E-2

SAFE CENTER LOADS FOR SCAFFOLD PLANK OF 1,100 POUNDS FIBRE STRESS

Span in Feet	Lumber dimensions in inches									
	A	B	A	B	A	B	A	B	A	B
	2 x 10	1⅝ x 9½	2 x 12	1⅝ x 11½	3 x 8	2⅝ x 7½	3 x 10	2⅝ x 9½	3 x 12	2⅝ x 11½
6	256		309		526		667		807	
8	192		232		395		500		605	
10	153		186		316		400		484	
12	128		155		263		333		404	
14	110		133		225		286		346	
16	......		116		197		250		303	

(A)—Rough lumber
(B)—Dressed lumber

TABLE G-1
MANILA ROPE
(In pounds or tons of 2000 pounds)

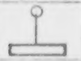
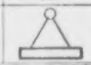
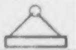
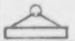
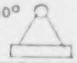
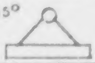
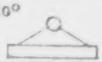
Circumference	Diameter in Inches	Single Leg	60°	45°	30°
					
3/4	1/4	120 lbs.	204 lbs.	170 lbs.	120 lbs.
1	5/16	200	346	282	200
1-1/8	3/8	270	467	380	270
1-1/4	7/16	350	605	493	350
1-3/8	15/32	450	775	635	450
1-1/2	1/2	530	915	798	530
1-3/4	9/16	690	1190	973	690
2	5/8	880	1520	1240	880
2-1/4	3/4	1080	1870	1520	1080
2-1/2	13/16	1300	2250	1830	1300
2-3/4	7/8	1540	2660	2170	1540
3	1	1800	3120	2540	1800
3-1/4	1-1/16	1.0 Tons	1.7 Tons	1.4 Tons	1.0 Tons
3-1/2	1-1/8	1.2	2.1	1.7	1.2
3-3/4	1-1/4	1.35	2.3	1.9	1.35
4	1-5/16	1.5	2.6	2.1	1.5
4-1/2	1-1/2	1.8	3.1	2.5	1.8
5	1-5/8	2.25	3.9	3.2	2.25
5-1/2	1-3/4	2.6	4.5	3.7	2.6
6	2	3.1	5.4	4.4	3.1
6-1/2	2-1/8	3.6	6.2	5.1	3.6

TABLE G-2
RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE AND WIRE ROPE SLINGS
(In tons of 2000 pounds)

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4"	.59	.56	.53	.44	.42	.40
3/8"	1.3	1.2	1.1	.98	.93	.86
1/2"	2.3	2.2	2.0	1.7	1.6	1.5
5/8"	3.6	3.4	3.0	2.7	2.5	2.2
3/4"	5.1	4.9	4.2	3.8	3.6	3.1
7/8"	6.9	6.6	5.5	5.2	4.9	4.1
1"	9.0	8.5	7.2	6.7	6.4	5.4
1-1/8"	11.	10.	9.0	8.5	7.8	6.8
6x37 CLASSIFICATION						
1-1/4"	13.	12.	10.	9.9	9.2	7.9
1-3/8"	16.	15.	13.	12.	11.	9.6
1-1/2"	19.	17.	15.	14.	13.	11.
1-3/4"	26.	24.	20.	19.	18.	15.
2"	33.	30.	26.	25.	23.	20.
2-1/4"	41.	38.	33.	31.	29.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-3
RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE SLINGS
(In tons of 2000 pounds)

Rope Dia. Inches	TWO - LEG BRIDLE OR BASKET HITCH											
	Vertical			60° 			45° 			30° 		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4"	1.2	1.1	1.0	1.0	.97	.92	.83	.79	.75	.59	.56	.53
3/8"	2.6	2.5	2.3	2.3	2.1	2.0	1.8	1.8	1.6	1.3	1.2	1.1
1/2"	4.6	4.4	3.9	4.0	3.8	3.4	3.2	3.1	2.8	2.3	2.2	2.0
5/8"	7.2	6.8	6.0	6.2	5.9	5.2	5.1	4.8	4.2	3.6	3.4	3.0
3/4"	10.	9.7	8.4	8.9	8.4	7.3	7.2	6.9	5.9	5.1	4.9	4.2
7/8"	14.	13.	11.	12.	11.	9.6	9.8	9.3	7.8	6.9	6.6	5.5
1"	18.	17.	14.	15.	15.	12.	13.	12.	10.	9.0	8.5	7.2
1-1/8"	23.	21.	18.	19.	18.	16.	16.	15.	13.	11.	10.	9.0
6x37 CLASSIFICATION												
1-1/4"	26.	24.	21.	23.	21.	18.	19.	17.	15.	13.	12.	10.
1-3/8"	32.	29.	25.	28.	25.	22.	22.	21.	18.	16.	15.	13.
1-1/2"	38.	35.	30.	33.	30.	26.	27.	25.	21.	19.	17.	15.
1-3/4"	51.	47.	41.	44.	41.	35.	36.	33.	29.	26.	24.	20.
2"	66.	61.	53.	57.	53.	46.	47.	43.	37.	33.	30.	26.
2-1/4"	83.	76.	66.	72.	66.	57.	58.	54.	47.	41.	38.	33.

(A) - Socket or Swaged Terminal Attachment.
(B) - Mechanical Sleeve Attachment.
(C) - Hand Tucked Splice Attachment.

TABLE G-4

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE AND WIRE ROPE SLINGS

(In tons of 2000 pounds)

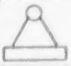
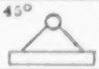
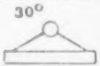
Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4	.55	.51	.49	.41	.38	.37
3/8	1.2	1.1	1.1	.91	.85	.80
1/2	2.1	2.0	1.8	1.6	1.5	1.4
5/8	3.3	3.1	2.8	2.5	2.3	2.1
3/4	4.8	4.4	3.9	3.6	3.3	2.9
7/8	6.4	5.9	5.1	4.8	4.5	3.9
1	8.4	7.7	6.7	6.3	5.8	5.0
1-1/8	10.	9.5	8.4	7.9	7.1	6.3
6x37 CLASSIFICATION						
1-1/4	12.	11.	9.8	9.2	8.3	7.4
1-3/8	15.	13.	12.	11.	10.	8.9
1-1/2	17.	16.	14.	13.	12.	10.
1-3/4	24.	21.	19.	18.	16.	14.
2	31.	28.	25.	23.	21.	18.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-5

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE SLINGS

(In tons of 2000 pounds)

TWO - LEG BRIDLE OR BASKET HITCH												
Rope Dia. Inches	Vertical			60° 			45° 			30° 		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4	1.1	1.0	.99	.95	.88	.85	.77	.73	.70	.55	.51	.49
3/8	2.4	2.2	2.1	2.1	1.9	1.8	1.7	1.6	1.5	1.2	1.1	1.1
1/2	4.3	3.9	3.7	3.7	3.4	3.2	3.0	2.8	2.6	2.1	2.0	1.8
5/8	6.7	6.2	5.6	5.8	5.3	4.8	4.7	4.4	4.0	3.3	3.1	2.8
3/4	9.5	8.8	7.8	8.2	7.6	6.8	6.7	6.2	5.5	4.8	4.4	3.9
7/8	13.	12.	10.	11.	10.	8.9	9.1	8.4	7.3	6.4	5.9	5.1
1	17.	15.	13.	14.	13.	11.	12.	11.	9.4	8.4	7.7	6.7
1-1/8	21.	19.	17.	18.	16.	14.	15.	13.	12.	10.	9.5	8.4
6x37 CLASSIFICATION												
1-1/4	25.	22.	20.	21.	19.	17.	17.	16.	14.	12.	11.	9.8
1-3/8	30.	27.	24.	26.	23.	20.	21.	19.	17.	15.	13.	12.
1-1/2	35.	32.	28.	30.	27.	24.	25.	22.	20.	17.	16.	14.
1-3/4	48.	43.	38.	41.	37.	33.	34.	30.	27.	24.	21.	19.
2	62.	55.	49.	53.	48.	43.	43.	39.	35.	31.	28.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-6—NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel, rope diameter, inches	Number of clips		Minimum spacing, inches
	Drop forged	Other material	
*	......	.....	....
1/2	3	4	3
5/8	3	4	3 3/4
3/4	4	5	4 1/2
7/8	4	5	5 1/4
1	4	6	6
1 1/8	5	6	6 3/4
1 1/4	5	7	7 1/2
1 3/8	6	7	8 1/4
1 1/2	6	8	9

* Three clips shall be used on wire size less than 1/2-inch diameter.

TABLE G-7
WROUGHT IRON CHAIN
(In pounds or tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
* 1/4	1060	1835	1500	1060
* 5/16	1655	2865	2340	1655
3/8	2385	2.1	3370	2385
* 7/16	3250	2.8	2.3	3250
1/2	2.1	3.7	3.0	2.1
* 9/16	2.7	4.6	3.8	2.7
5/8	3.3	5.7	4.7	3.3
3/4	4.8	8.3	6.7	4.8
7/8	6.5	11.2	9.2	6.5
1	8.5	14.7	12.0	8.5
1-1/8	10.0	17.3	14.2	10.0
1-1/4	12.4	21.4	17.5	12.4
1-3/8	15.0	25.9	21.1	15.0
1-1/2	17.8	30.8	25.2	17.8
1-5/8	20.9	36.2	29.5	20.9
1-3/4	24.2	42.0	34.3	24.2
1-7/8	27.6	47.9	39.1	27.6
2	31.6	54.8	44.8	31.6

* These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8
ALLOY STEEL CHAIN
(In tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
1/4	1.62	2.82	2.27	1.62
3/8	3.30	5.70	4.65	3.30
1/2	5.62	9.75	7.90	5.62
5/8	8.25	14.25	11.65	8.25
3/4	11.5	19.9	16.2	11.5
7/8	14.3	24.9	20.3	14.3
1	19.3	33.5	27.3	19.8
1-1/8	22.2	38.5	31.5	22.2
1-1/4	28.7	49.7	40.5	28.7
1-3/8	33.5	58.0	47.0	33.5
1-1/2	39.7	68.5	56.0	39.7
1-5/8	42.5	73.5	59.5	42.5
1-3/4	47.0	81.5	62.0	47.0

TABLE G-9

MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in fraction of inches
1/4 (9/32)	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	11/32

TABLE G-10

SAFE WORKING LOADS FOR SHACKLES

[In tons of 2000 pounds]

Material size (inches)	Pin diameter (inches)	Safe working load
1/2	5/8	1.4
5/8	3/4	2.2
3/4	7/8	3.2
7/8	1	4.3
1	1 1/8	5.6
1 1/8	1 1/4	6.7
1 1/4	1 3/8	8.2
1 3/8	1 1/2	10.0
1 1/2	1 5/8	11.9
1 3/4	2	16.2
2	2 1/4	21.2

TABLE I-1

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operation	Shade No.
Soldering	2
Torch Brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1-6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Light gas welding, up to 1/8 inch	4 or 5
Medium gas welding, 1/8-1/2 inch	5 or 6
Heavy gas welding, over 1/2 inch	6 or 8
Shielded Metal-Arc Welding 1/16- to 5/32-inch electrodes.	10
Inert-gas Metal-Arc Welding (Nonferrous) 1/16- to 5/32-inch electrodes.	11
Inert-gas Metal-Arc Welding (Ferrous) 1/16- to 5/32-inch electrodes.	12
Shielded Metal-Arc Welding:	
3/16- to 1/4-inch electrodes	12
5/16- and 3/8-inch electrodes	14
Atomic Hydrogen Welding	10 to 14
Carbon Arc Welding	14

PART 1917—SHIPBREAKING

SUBPART H—TOOLS AND RELATED EQUIPMENT

1917.71 General precautions.
1917.72 Portable electric tools.
1917.73 Hand tools.
1917.74 Abrasive wheels.
1917.76 Internal combustion engines, other than ship's equipment.

SUBPART H—TOOLS AND RELATED EQUIPMENT

1917.71—GENERAL PRECAUTIONS

(a) Hand lines, slings, tackles of adequate strength, or carriers such as tool bags with shoulder straps shall be provided and used to handle tools, materials, and equipment so that employees will have their hands free when using ship's ladders and access ladders. The use of hose or electric cords for this purpose is prohibited.

(b) When air tools of the reciprocating type are not in use, the dies and tools shall be removed.

(c) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(d) The moving parts of machinery on dry docks shall be adequately guarded.

(e) Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.

(f) The moving parts of drive mechanisms, such as gearing and belting on large portable tools, shall be adequately guarded.

(g) Headers, manifolds, and widely spaced hose connections on compressed air lines shall bear the word "air" in letters at least 1 inch high, which shall be painted either on the manifold or separate hose connections, or on signs permanently attached to the manifolds or connections. Grouped air connections may be marked in one location.

(h) Before use, compressed air hose shall be examined. Visibly damaged and unsafe hose shall not be used.

1917.72—PORTABLE ELECTRIC TOOLS

(a) The frames of portable electric tools and appliances, except double insulated tools approved by Underwriters' Laboratories, shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(b) Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(c) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.

(d) Worn or frayed electric cables shall not be used.

1917.73—HAND TOOLS

(a) Employers shall not issue or permit the use of unsafe hand tools.

(b) Wrenches, including crescent, pipe, end and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.

(c) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(d) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

1917.74—ABRASIVE WHEELS

(a) Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(b) Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed 1/8 inch from the surface of the wheel.

(c) Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard in accordance with the provisions of the United States of America Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of paragraph (e) of this section, except as follows:

(1) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in paragraph (f) of this section shall be used.

(2) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(d) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of paragraph (f) of this section, except as follows:

(1) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(2) If the wheel is entirely within the work being ground while in use.

(e) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

(f) When safety flanges are required they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of accidental breakage shall be used.

(g) All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.

(h) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(i) The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.

(j) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of § 1917.81 (a) and (b), except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

1917.76—INTERNAL COMBUSTION ENGINES, OTHER THAN SHIP'S EQUIPMENT

(a) When internal combustion engines, furnished by the employer are used in a fixed position below decks, for such purposes as driving pumps, generators, and blowers, the exhaust shall be led to the open air, clear of any ventilation intakes and openings through which it might enter the vessel.

(b) All exhaust line joints and connections shall be checked for tightness immediately upon starting the engine, and any leaks shall be corrected at once.

(c) When internal combustion engines on vehicles, such as forklifts and mobile cranes, or on portable equipment such as fans, generators, and pumps exhaust into the atmosphere below decks, the competent person shall make tests of the carbon monoxide content of the atmosphere as frequently as conditions require to ensure that dangerous concentrations do not develop. Employees shall be removed from the compartment involved when the carbon monoxide concentration exceeds 50 parts per million (0.005%). The employer shall use blowers sufficient in size and number and so arranged as to maintain the concentration below this allowable limit before work is resumed.

PART 1917—SHIPBREAKING

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1917.81 Eye protection.
1917.82 Respiratory protection.
1917.83 Head, foot and body protection.
1917.84 Life saving equipment.

SUBPART I—PERSONAL PROTECTIVE EQUIPMENT

1917.81—EYE PROTECTION

(a) General precautions.

(1) All eye protection equipment required by the regulations in this part shall meet the specifications prescribed by the American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1.

(2) Eye protection equipment shall be maintained in good condition.

(3) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personal spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

(b) Protection against impact.

(1) In any operations such as chipping, caulking, drilling, riveting, grinding, and pouring babbitt metal, in which the eye hazard of flying particles, molten metal, or liquid chemical exists, employees shall be protected by suitable face shields or goggles meeting the requirements of paragraph (a) of this section.

(c) Protection against radiant energy.

(1) In any operation in which the eye hazard of injurious light rays or other radiant energy exists, depending upon the intensity of the radiation to which employees are exposed, they shall be protected by spectacles, cup goggles, helmets, hand shields, or face shields equipped with filter lenses meeting the requirements of paragraphs (a) and (c) (2) of this section.

(2) Filter lenses shall be of a shade number appropriate to the type of work to be performed as indicated in Table I-1 in § 1917.68, except that variations of one or two shade numbers are permissible to suit individual preferences.

(3) If filter lenses are used in the goggles worn under the helmet, the shade number of the lens in the helmet may be reduced so that the sum of the shade numbers of the two lenses will equal the value shown in Table I-1 in § 1917.68.

1917.82—RESPIRATORY PROTECTION

(a) General.

(1) All respiratory protective equipment required by these regulations shall carry the U.S. Bureau of Mines approval for the use for which it is intended. Respiratory protective equipment shall be used only for the purpose intended and no modifications of the equipment shall be made.

(2) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(3) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

(4) Employees required to use respiratory protective equipment approved for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(5) When an air line respirator is used, the air line shall be fitted with a pressure regulating valve and a filter which will remove oil, water, and rust particles. The air intake shall be from a source which is free from all contaminants, such as the exhaust from internal combustion engines.

(6) In all cases, when an employee is stationed outside a compartment, tank or space as a tender or safety man for men working inside in an atmosphere immediately dangerous to life, the tender shall have immediately available for emergency use respiratory protective equipment equivalent to that required for the men in the compartment. When a tender is stationed outside a compartment for men working inside in an atmosphere not immediately dangerous to life, the tender shall wear respiratory protective equipment equivalent to that required for the men in the compartment if he is exposed for prolonged periods to the same concentration of atmospheric contaminants.

(b) Protection in atmospheres immediately dangerous to life.

(1) Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or high concentration of the contaminant, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(2) In atmospheres immediately dangerous to life the only approved types of respiratory protective equipment are the following:

(i) Self-contained breathing apparatus, in which the wearer carries with him a supply of oxygen, air, or an oxygen generating material.

(ii) Hose mask with blower, in which a hand or motor operated blower supplies air at high volume and low pressure through a large diameter hose through which the wearer can draw air in case the blower fails.

(iii) If there is known to be more than 16 percent oxygen and less than 2 percent gas by volume, a gas mask equipped with a canister approved for the particular type gas involved.

(3) Work in atmospheres immediately dangerous to life shall be performed only in an emergency, as when rescuing a man who has been overcome or when shutting off a source of contamination that cannot otherwise be controlled. When an employee enters such an atmosphere he shall be provided with and use an adequate, attended life line.

(4) In the vicinity of each vessel in which there is a danger of employees being exposed to an atmosphere immediately dangerous to life the employer shall have on hand and ready for use respiratory protective equipment approved for such use. When such equipment is required, one or more persons shall be thoroughly trained in the use of the equipment.

(c) Protection against gaseous contaminants not immediately dangerous to life.

(1) Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short

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NOTE: A gas mask offers absolutely no protection in an atmosphere deficient in oxygen.

period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short exposures.

(2) When employees are exposed to a gaseous contaminated atmosphere not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the gaseous contaminant as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator in lower concentrations is permissible.

(ii) In concentrations of ammonia of less than 3 percent or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister. Different canisters are approved for specific use against the following cases or groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide, or combination of the above.

(iii) In low concentrations (less than 0.1 percent by volume), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in subdivision (ii) of this subparagraph.

(d) Protection against particulate contaminants not immediately dangerous to life.

(1) When employees are exposed to unsafe concentrations of particulate contaminants, such as dusts and fumes, mists and fogs or combinations of solids and liquids, they shall be protected by either air line or filter respirators, except as otherwise provided in the regulations of this part.

(2) Filter respirators shall be equipped with the proper type of filter. Different filters are approved for specific protection against groups of contaminants, as follows:

(i) Pneumoconiosis-producing dust and nuisance dust filters which provide respiratory protection against pneumoconiosis-producing dusts, such as aluminum, cellulose, cement, charcoal, coal, coke, flour, gypsum, iron ore, limestone and wood.

(ii) Toxic dust filters which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.

(iii) Mist filters which provide respiratory protection against pneumoconiosis-producing mists, chromic acid mists and nuisance mists.

(iv) Fume filters which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors, such as those from heated metals and other substances).

(v) Filters which provide respiratory protection against combinations of two or more of the contaminants described in subdivisions (i) through (iv) of this subparagraph.

(e) Protection against combinations of gaseous and particulate contaminants not immediately dangerous to life.

(1) When employees are exposed to combinations of gaseous and particulate contaminants not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentrations of the contaminants, as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator is permissible in lower concentrations.

(ii) In concentrations of gaseous contaminants of less than 2 percent by volume, a consister type gas mask with a combination canister approved for the particular type of gaseous contaminant as specified in paragraph (c)(2) of this section and a filter for the particular type of particulate contaminant as specified in paragraph (d)(1) of this section.

(iii) In low concentrations of gaseous contaminants (less than 0.1 percent by volume) a respirator equipped with the type of cartridge and filter as specified in subdivision (ii) of this subparagraph.

1917.83—HEAD, FOOT AND BODY PROTECTION

(a) When employees are working in areas where there is danger of falling objects they shall be protected by protective hats.

(b) Protective hats shall meet the specifications contained in the United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1. Hats without dielectric strength shall not be used where there is the possibility of contact with electric conductors.

(c) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

(d) The employer shall arrange through means, such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use. Metal toe caps from which the covering has been worn shall be insulated when employees are working on exposed energized circuits of the vessel's electrical system.

(e) Employees shall not be permitted to wear excessively greasy clothing when performing hot work operations.

(f) Employees shall be protected by suitable gloves when engaged in operations hazardous to their hands.

1917.84—LIFE SAVING EQUIPMENT

(a) Personal flotation devices.

(1) Any personal flotation device shall be approved by the United States Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or their equivalent, pursuant to 46 CFR 160 (Coast Guard Lifesaving Equipment Specifications) and 33 CFR 175.23 (Coast Guard table of devices equivalent to personal flotation devices).

(2) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

[39 F.R. 15124, May 1, 1974.]

(b) Safety belts and lifelines.

(1) Safety belts shall be equipped with lifelines which in use are secured with a minimum of slack to a fixed structure.

(2) Prior to each use, belts and lifelines shall be inspected for dry rot, chemical damage, or other defects which may affect their strength. Defective belts and lifelines shall not be used.

(3) When employees are working in any location requiring a safety belt and a lifeline, care shall be exercised to insure that the lifeline is not cut, pinched, or led over a sharp edge. In hot work operations or those involving the use of acids, solvents, or caustics, the line shall be kept clear to avoid its being burned or weakened. In order to keep the lifeline continuously attached with a minimum of slack to a fixed structure the attachment point of the lifeline shall be appropriately changed as the work progresses.

(4) When employees are working in any location requiring a safety belt and a life line, as required in subparagraph (1) or (2) of this paragraph, care shall be exercised to ensure that the life line is not cut, pinched or led over a sharp edge. In hot work operations or those involving the use of acids or caustics the line shall be kept clear to avoid its being burned or weakened. In order to keep the life line continuously attached with a minimum of slack to a fixed structure, the attachment point of the life line shall be appropriately changed as the work progresses.

(c) Life rings and ladders.

(1) At least three 30-inch Coast Guard approved life rings with lines attached shall be kept in easily visible and readily accessible places in the immediate vicinity of each vessel afloat on which work is being performed.

(2) At least one life ring with a line attached shall be located on each staging float alongside a vessel on which work is being performed.

(3) At least 90 feet of line shall be attached to each life ring. Life rings and lines shall be maintained in good condition.

(4) In the vicinity of each vessel afloat in which work is being performed there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event that they fall into the water.

PART 1918 INTERP

SAFETY AND HEALTH REGULATIONS FOR LONGSHORING

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EXHIBIT I—CARGO GEAR REGISTER AND CERTIFICATES

AUTHORITY: The provisions of this Part 1918 and Exhibit I, issued under sec. 41, 44 Stat. 1444, as amended; 33 U.S.C. 941.

PART 1918—LONGSHORING

SUBPART A—GENERAL PROVISIONS

1918.1 Purpose and authority.
1918.2 Scope and responsibility.
1918.3 Definitions.
1918.4 Penalty.
1918.5 [Reserved]
1918.6 Standards incorporated by reference.
1918.7 Notification of accidents resulting in fatalities or serious injuries.
1918.8 Amendment of this part.

SUBPART A—GENERAL PROVISIONS

1918.1—PURPOSE AND AUTHORITY

(a) The Longshoremen's and Harbor Workers' Compensation Act (44 Stat. 1424; 33 U.S.C. 901 et seq.) provides compensation for injuries suffered by employees when they are working for private employers within the Federal maritime jurisdiction on the navigable waters of the United States, including dry docks. Public Law 85–742, 72 Stat. 835, approved August 23, 1958, which amends section 41 of the Longshoremen's and Harbor Workers' Compensation Act, as amended (44 Stat. 1444; 33 U.S.C. 941) requires, among other things, that every employer of the aforementioned employees "shall install, furnish, maintain, and use such devices and safeguards with particular reference to equipment used by and working conditions established by such employers as the Secretary may determine by regulation or order to be reasonably necessary to protect the life, health, and safety of such employees, and to render safe such employment and places of employment, and to prevent injury to his employees." It is the purpose of the regulations of this part to carry out the intent of Public Law 85–742.

(b) Pursuant to Public Law 85–742 the regulations of this part do not make determinations with respect to matters under the control of the U.S. Coast Guard within the scope of Title 52 of the Revised Statutes and Acts supplementary or amendatory thereto (46 U.S.C. 1–1388, passim), including, but not restricted to, the master, ship's officers, crew members, design, construction and maintenance of the vessel, its gear and equipment; to matters within the regulatory authority of the U.S. Coast Guard to safeguard vessels, harbors, ports, and waterfront facilities under the provisions of the Espionage Act of June 15, 1917, as amended (40 Stat. 220; 50 U.S.C. 191 et seq.; 22 U.S.C. 401 et seq.) or to matters within the regulatory authority of the U.S. Coast Guard with respect to lights, warning devices, safety equipment and other matters relating to the promotion of safety of lives and property under section 4(e) of the Outer Continental Shelf Lands Act of August 7, 1953 (67 Stat. 462; 43 U.S.C. 1333).

1918.2—SCOPE AND RESPONSIBILITY

(a) The responsibility for compliance with the regulations of this part is placed upon "employers" as defined in § 1918.3(c).

(b) It is not the intent of the regulations of this part to place additional responsibilities or duties on owners, operators, agents or masters of vessels unless such persons are acting as employers, nor is it the intent of these regulations to relieve such owners, operators, agents or masters of vessels from responsibilities or duties now placed upon them by law, regulation or custom.

1918.3—DEFINITIONS

(a) The term "shall" indicates provisions which are mandatory.

(b) The term "Secretary" means the Secretary of Labor.

(c) The term "employer" means an employer any of whose employees are employed, in whole or in part, in longshoring operations or related employments, as defined herein within the Federal maritime jurisdiction on the navigable waters of the United States.

(d) The term "employee" means any longshoreman, or other person engaged in longshoring operations or related employments, within the Federal maritime jurisdiction on the navigable waters of the United States, other than the master, ship's officers, crew of the vessel, or any person engaged by the master to load or unload any vessel under 18 net tons.

(e) The term "vessel" includes every description of watercraft or other artificial contrivance used or capable of being used as a means of transportation on water, including special purpose floating structures not primarily designed for or used as a means of transportation on water.

(f) The term "public vessel" means a vessel owned and operated by a government and not regularly employed in merchant service.

(g) For the purposes of §§ 1918.11, 1918.23, 1918.35, 1918.37, 1918.43(f)(2), and 1918.106, the term "barge" means an unpowered, flat bottom, shallow draft vessel including river barges, scows, carfloats, and lighters. For the purposes of these sections the term does not include ship shaped or deep draft barges.

(h) For purposes of §§ 1918.11 and 1918.23, the term "river towboat" means a shallow draft, low freeboard, self propelled vessel designed to tow river barges by pushing ahead. For purposes of these sections the term does not include other towing vessels.

(i) The term "longshoring operations" means the loading, unloading, moving, or handling of cargo, ship's stores, gear, etc., into, in, on, or out of any vessel on the navigable waters of the United States.

(j) The term "related employments" means any employments performed as an incident to or in conjunction with longshoring operations including, but not restricted to, securing cargo, rigging, and employment as a porter, checker, or watchman.

(k) The term "gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel, including accommodation ladders, gangplanks and brows.

(l) The term "bulling" means the horizontal dragging of cargo across a surface with none of the weight of the cargo supported by the fall.

(m) For the purpose of § 1918.12 the term "ship's cargo handling gear" includes that gear which is a permanent part of the vessel's equipment and which is used for the handling of cargo other than bulk liquids, but does not include gear which is used only for handling or holding hoses, handling ship's stores or handling the gangway, or boom conveyor belt systems for the self-unloading of bulk cargo vessels.

(n) For purposes of the regulations in this part the terms "beam" or "strongback" mean a portable transverse or longitudinal beam which is placed across a hatchway and acts as a bearer to support the hatch covers.

(o) For the purposes of §§ 1918.23(b)(2) and 1918.106(b) the term "Mississippi River System" includes the Mississippi River from the head of navigation to its mouth, and navigable tributaries including the Illinois Waterway, Missouri River, Ohio River, Tennessee River, Allegheny River, Cumberland River, Green River, Kanawha River, Monongahela River, and such others to which barge operations extend.

(p) For the purpose of § 1918.106(b) the term "Gulf Intracoastal Waterway" means the system of that name extending from St. Mark's, Fla., to Brownsville and Harlingen, Tex., and including the Pearl River, Tombigbee River, Apalachicola River, Flint River, and such other navigable tributaries to which barge operations extend.

(q) The term "small trimming hatch" means a small hatch or opening, pierced in the 'tweendeck or other intermediate deck of a vessel and intended for the trimming of dry bulk cargoes.

It does not refer to the large hatchways through which cargo is normally handled.

(r) For the purpose of § 1918.13 only—

(1) The term "crane" means a mechanical device intended for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. A crane may be a fixed or mobile machine.

(2) The term "derrick" means a mechanical device intended for lifting, with or without a boom supported at its head by a topping lift from a mast, fixed A frame, or similar structure. The mast or equivalent member may or may not be supported by guys or braces. The boom, where fitted, may or may not be controlled in the horizontal plane by guys (vangs). The term shall include shear legs.

(3) The term "bulk cargo spout" means a spout, which may or may not be telescopic and may or may not have removable sections, but is suspended over the vessel from some overhead structure by wire rope or other means. Such a spout is often used with a thrower or trimming machine. A grain loading spout is an example of spouts covered by this definition.

(4) The term "bulk cargo sucker" means a pneumatic conveyor which utilizes a spout-like device, which may be adjustable vertically and/or laterally, and which is suspended over a vessel from some overhead structure by wire rope or other means. An example of an installation of this nature is the grain sucker used to discharge grain from barges.

(5) Unless otherwise specifically required, the terms defined in this paragraph shall not include, and the provisions of § 1918.13 shall not apply to, the following equipment:

(i) Small industrial crane trucks as described and illustrated in American National Standards Institute, B56.1, 1959, "Safety Code for Powered Industrial Trucks."

(ii) Huletts.

(iii) Bridge cranes including steeple towers and dock-leg elevators.

(iv) Ore and taconite loading facilities of such type that failure could not cause injury to an employee as defined in paragraph (d) of this section.

(v) Bulk coal loading facilities.

(vi) Vertical pocket conveyors such as banana, sugar, or other similar marine legs.

(s) The term "hazardous cargo" includes:

(1) Any packaged commodity in the "List of explosives and other dangerous articles and combustible liquids" of the "dangerous cargoes" regulations of the U.S. Coast Guard (46 CFR 146.04–5) requiring a label, without regard to the exemptions mentioned at the foot of the list;

(2) Any packaged commodity in the list identified in subparagraph (1) of this paragraph, not requiring a label but classed as a combustible liquid;

(3) Any packaged liquid commodity in the list identified in subparagraph (1) of this paragraph not requiring a label but classed as a hazardous article; or

(4) Any article not properly described by a name in that list but which is properly classified under the definition of those categories of dangerous articles given in 46 CFR 146.03–8 and is included in subparagraph (1), (2), or (3) of this paragraph.

1918.4—PENALTY

1918.4—Deleted

[38 F.R. 5467, March 1, 1973.]

1918.5—[RESERVED]

1918.6—STANDARDS INCORPORATED BY REFERENCE

(a) The standards listed below are hereby incorporated by reference in this part:

(1) American National Standard (USAS) Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1968), American National Standards Institute, 1430 Broadway, New York, NY 10018. See Subpart J, § 1504.105(a).

(2) American National Standard Safety Requirements for Industrial Head Protection, Z89.1 (1969), American National Standards Institute, 1430 Broadway, New York, NY 10018. See Subpart J, § 1918.105(a).

(b) Standards which are legally incorporated by reference in this part have the same force and effect as other standards in this part. The locations where these standards may be examined are as follows:

(1) Occupational Safety and Health Administration, U.S. Department of Labor, Railway Labor Building, Washington, DC 20210.

(2) The Regional and Field Offices of the Occupational Safety and Health Administration which are listed in the U.S. Government Organizational Manual.

(c) Any changes in the standards which are incorporated by reference in this part and an official historic file of such changes are available at the offices referred to in paragraph (b) of this section. All questions as to the applicability of such changes should also be referred to these offices.

(d) Copies of the standards incorporated by reference in paragraph (a) of this section may be obtained from the American National Standards Institute at the address indicated therein.

1918.7—NOTIFICATION OF ACCIDENTS RESULTING IN FATALITIES OR SERIOUS INJURIES

1918.7—Deleted

[38 F.R. 5467, March 1, 1973.]

1918.8—AMENDMENT OF THIS PART

The Secretary may at any time upon his own motion or upon written petition of any interested person setting forth reasonable grounds therefor, and after opportunity has been given to interested persons to present their views, amend or revoke any of the provisions of this part.

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PART 1918—LONGSHORING

SUBPART B—GANGWAYS AND GEAR CERTIFICATION

1918.11 Gangways.
1918.12 Gear certification.
1918.13 Certification of shore-based material handling devices.
1918.14 Container cranes.
1918.15 Effective date of §§ 1918.13 and 1918.14.

SUBPART B—GANGWAYS AND GEAR CERTIFICATION

1918.11—GANGWAYS[1]

The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(a) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface, and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor straight ladder can be used, a Jacob's ladder meeting the requirements of § 1918.22 may be used.

(b) Each side of such gangway, and the turntable, if used, shall have a railing with a minimum height of 33 inches measured perpendicularly from rail to walking surfaces at the stanchion, with a mid-rail. Rails shall be of wood, pipe, chain, wire or rope and shall be kept taut at all times. Portable stanchions supporting railings shall be so supported or secured as to prevent accidental dislodgment.

(c) Gangways on vessels inspected and certificated by the U.S. Coast Guard are deemed to meet the foregoing requirements, except in cases where the vessels' regular gangway is not being used.

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[1] See also § 1918.21.

1918.12—GEAR CERTIFICATION[2]

(a) The employer shall not use the vessel's cargo handling gear until he has ascertained that the vessel has a current and valid cargo gear register and certificates which in form and content are in substantial accordance with the recommendations of the International Labor Office, as set forth in Exhibit I of this part, and as provided by International Labor Organization Convention No. 32, and which indicates that the cargo gear has been tested, examined and heat treated by or under the supervision of persons or organizations defined as competent to make register entries and issue certificates pursuant to paragraphs (c) and (d) of this section.

(b) Public vessels and vessels holding a valid Certificate of Inspection issued by the U.S. Coast Guard are deemed to meet the requirements of paragraph (a) of this section.

(c) With respect to U.S. vessels not holding a valid Certificate of Inspection issued by the U.S. Coast Guard, persons or organizations competent to make entries in the registers and issue the certificates required by paragraph (a) of this section shall be only those persons currently accredited by the Occupational Safety and Health Administration, U.S. Department of Labor, as provided in Part 1919 of this chapter.

(d) With respect to vessels under foreign registry, persons or organizations competent to make entries in the registers and issue the certificates required by paragraph (a) of this section shall be:

(1) Those acceptable as such to any foreign nation,

(2) Those acceptable to the Commandant of the U.S. Coast Guard, or

(3) Those currently accredited by the Occupational Safety and Health Administration, U. S. Department of Labor, as provided in Part 1919 of this chapter.

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[2] See also § 1918.51.

1918.13—CERTIFICATION OF SHORE-BASED MATERIAL HANDLING DEVICES

(a) An employer shall not use in vessel-to-shore, shore-to-vessel, or in vessel-to-vessel cargo handling any crane, derrick, bulk cargo spout, or bulk cargo sucker, as defined in § 1918.3(r), which—

(1) Is not part of a vessel's permanent equipment and is either located ashore or placed aboard a vessel only temporarily; and

(2) Is used to transfer cargo or materials other than bulk liquids directly between the shore and a vessel or between vessels; and

(3) Is so located that its failure could cause injury to an employee, as defined in § 1918.3 (d); until he has ascertained that the device has been certificated as evidenced by current and valid documents attesting to compliance with the requirements specified in paragraph (b) of this section.

(b) The certification required by paragraph (a) of this section must have been performed—

(1) In accordance with the standards of Part 1919 of this chapter, by persons then currently accredited by the Occupational Safety and Health Administration as provided in Part 1919 of this chapter; or

(2) In accordance with standards established and enforced by the State in which the device is located, or by a political subdivision thereof, which have been found by the Assistant Secretary of Labor for Occupational Safety and Health Administration, U.S. Department of Labor, to be compatible with the standards of Part 1919 of this chapter, by persons designated as competent to perform such certification by competent state authority and recognized as such by the Assistant Secretary of Labor for Occupational Safety and Health Administration.

(c) Cranes and derricks shall have been tested as a unit, inspected and/or examined, at the intervals required by, and in accordance with applicable requirements set forth in, paragraph (b) of this section. Appropriate documentation, acceptable for the purpose, shall be available for inspection at the worksite.

(d) Bulk cargo spouts and suckers, together with any portable extensions and rigging or outriggers associated therewith which support them vertically, need not be tested, but shall be subject to an annual examination in accordance with applicable requirements as set forth in paragraph (b) of this section. Certificates attesting to the required examination and acceptable for the purpose shall be available for inspection.

(e) Disassembly and reassembly of equipment, which is necessary for movement from job to job, or which becomes necessary during the normal course of operations as a routine matter, does not nullify existing certification nor require additional certification functions to be carried out.

(f) Where equipment which is certificated in accordance with paragraph (b) of this section is transferred for use in another state, the then current and valid certification shall remain valid until the next survey becomes due.

(g) In the case of seasonal operations, initial certification required by this section may be deferred until the end of the current season. Subsequent annual and/or quadrennial requirements will then become applicable during normally idle periods.

(h) Certification procedures shall not be construed as a substitute for, or cause for elimination of, normal operational inspection and maintenance routine throughout the year, which shall be carried out as usual by operating and maintenance personnel.

1918.14—CONTAINER CRANES

The provisions of § 1918.13 requiring certification of certain shore-based material handling devices shall apply to any crane utilized to handle containers in containerized operations between the vessel and the shore.

1918.15—EFFECTIVE DATE OF §§ 1918.13 AND 1918.14

Sections 1918.13 and 1918.14 shall become effective February 1, 1970.

PART 1918—LONGSHORING

SUBPART C—MEANS OF ACCESS

1918.21 Gangways and other means of access.
1918.22 Jacob's ladders.
1918.23 Access to barges and river towboats.
1918.24 Bridge plates and ramps.
1918.25 Ladders.

SUBPART C—MEANS OF ACCESS

1918.21—GANGWAYS AND OTHER MEANS OF ACCESS

(a) The gangway shall be kept properly trimmed at all times.

(b) When a fixed tread accommodation ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(c) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(d) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings with a minimum height of approximately 33 inches with midrails on both sides.

(e) Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(f) When the upper end of the means of access rests on or is flush with the top of the bulwark, substantial steps, properly secured and equipped with at least one substantial hand rail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(g) Obstructions shall not be laid on or across the gangway.

(h) The means of access shall be adequately illuminated for its full length.

(i) Unless the construction of the vessel makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event loads shall not be passed over the means of access while employees are on it.

1918.22—JACOB'S LADDERS

(a) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(b) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

1918.23—ACCESS TO BARGES AND RIVER TOWBOATS

(a) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained, and properly secured.

(b) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp meeting the requirements of paragraph (a) of this section or a safe walkway meeting the requirements of § 1918.21(d) shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of § 1918.22 may be used: *Provided, however*, That when these requirements cannot reasonably be met, by reason of local conditions, in respect to barges operating on the Mississippi River System, other safe means of access shall be provided.

(c) When a barge, raft or log boom is being worked alongside a larger vessel, a Jacob's ladder meeting the requirements of § 1918.22 shall be provided for each gang working alongside unless other safe means of access are provided.

(d) When longshoring operations are in progress on barges, the barges shall be securely made fast to the vessel, wharf, or dolphins.

1918.24—BRIDGE PLATES AND RAMPS

(a) Bridge or car plates used afloat shall be of adequate strength, equipped with side boards along the space bridged, well maintained, and secured against movement.

(b) Ramps for access of vehicles to or between vessels shall be of adequate strength, provided with side boards, well maintained and properly secured.

1918.25—LADDERS

(a) There shall be at least one safe and accessible ladder for each gang working in a hatch. However, no more than two such ladders are required in any hatch. An adequate means of gaining a handhold shall be provided at or near the head of each vertical fixed ladder in cases where any coaming or other structural features are such that they cannot serve this purpose.

(b) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(c) Straight ladders of adequate strength, of sufficient length to extend at least 36 inches above the coaming, and suitably secured against shifting or slipping, shall be provided as necessary when fixed hold ladders do not meet the requirements of paragraph (a) of this section, except that when conditions are such that a straight ladder cannot be used, Jacob's ladders meeting the requirements of § 1918.22 may be used.

(d) When 4 inches of clearance does not exist in back of ladder rungs, the ladder shall be deemed "unsafe" for the purpose of this section.

(e) When necessary to obtain access to or from a stowed deckload or other cargo and no other safe means is available, ladders or steps of adequate strength, and positively secured against shifting or slipping, shall be furnished. Where portable straight ladders are used they shall be of sufficient length to extend at least 36 inches above the upper landing surface. Adequate steps formed by the cargo itself are acceptable when the nature of the cargo and the type of stowage permits. This paragraph shall not apply to the circumstances covered by § 1918.54 (f).

(f) Portable straight ladders used by employees for any purpose not otherwise specifically covered by this part shall be of adequate strength and lashed, blocked, or otherwise secured against shifting or slipping.

PART 1918—LONGSHORING

SUBPART D—WORKING SURFACES

1918.31 Hatch coverings.
1918.32 Stowed cargo and temporary landing platforms.
1918.33 Deck loads.
1918.34 Skeleton decks.
1918.35 Open hatches.
1918.36 Weather deck rails.
1918.37 Barges.
1918.38 Freshly oiled decks.

SUBPART D—WORKING SURFACES

1918.31—HATCH COVERINGS

(a) No cargo, dunnage, or other material shall be loaded or unloaded by means requiring the services of employees at any partially opened intermediate deck unless either the hatch at that deck is sufficiently covered or an adequate landing area suitable for the prevailing conditions exists: *Provided, however,* That in no event shall such work be done unless the working area available for such employees extends for a distance of 10 feet or more fore and aft and athwartships.

(b) Cargo shall not be landed on or handled over a covered hatch or 'tween-deck unless all beams are in place under the hatch covers.

(c) Missing, broken, split, or poorly fitting hatch covers that would jeopardize the safety of employees shall be reported at once to the officers in charge of the vessel. Pending replacement or repairs by the vessel, work shall not be performed in the section containing the unsafe covers or in adjacent sections unless the flooring is made safe.

(d) When the hatch covers and beams are not of uniform size, they shall be placed only in the hatch, deck, and section in which they fit properly.

(e) Small trimming hatches located in intermediate decks shall be adequately covered or guarded while work is proceeding in the hatch in which they are located, unless they are actually in use.

1918.32—STOWED CARGO AND TEMPORARY LANDING PLATFORMS

(a) Temporary tables on which loads are to be landed shall be of sufficient size and strength to permit the employees thereon to work in safety.

(b) When an edge of a hatch section or of stowed cargo more than 8 feet high is so exposed that it presents a danger of an employee falling, the edge shall be guarded by a safety net of adequate strength to prevent injury to a falling employee, or by other means providing equal protection under the existing circumstances.

(c) When two gangs are working in the same hatch on different levels, a safety net shall be rigged and securely fastened so as to prevent men or cargo from falling.

1918.33—DECK LOADS

(a) Employees shall not be permitted to pass fore and aft over or around deck loads unless there is a safe passage.

(b) Signalmen shall not be permitted to walk over deck loads from rail to coaming unless there is a safe passage. If it is necessary to stand at the outboard or inboard edge of the deckload where less than 24 inches of bulwark, rail, coaming, or other protection exists, any signalman shall be provided with a suitable means of protection against falling from the deckload.

1918.34—SKELETON DECKS

No cargo shall be worked on a skeleton deck, mechano deck or other superstructure unless temporary flooring is provided, when necessary, to make a safe working surface.

1918.35—OPEN HATCHES

Open weather deck hatches around which longshoremen must work, which are not protected to a height of 24 inches by coamings, shall be guarded by taut lines at a height of 36 to 42 inches above the deck except on the side on which cargo is being worked. Any portable stanchions or uprights used shall be so supported or secured as to prevent accidental dislodgement: *Provided, however,* That the requirements of this section shall not be deemed to apply to barges or to Great Lakes type bulk carriers.

1918.36—WEATHER DECK RAILS

Removable weather deck rails shall be kept in place except when cargo operations require them to be removed, in which case they shall be replaced as soon as such cargo operations are completed.

1918.37—BARGES

(a) Employees shall not be permitted to walk along the sides of covered lighters or of barges with coamings more than 5 feet high unless there is a 3-foot clear walkway or a grab rail or taut handline is provided.

(b) Employees shall not be permitted to walk or work on the decks of barges to be loaded unless and until the walking or working surfaces have been determined by visual inspection to be sound structurally and maintained properly. If in the course of discharging a barge an unsound deck surface is discovered, work shall be discontinued and shall not be resumed until temporary means to ensure a safe work surface, or to avoid the unsound surface, shall have been taken.

1918.38—FRESHLY OILED DECKS

If decks are wet with fresh paint or oil, the employer shall not permit employees to engage in longshoring operations until necessary walking and working areas have been made safe by the use of suitable non-skid materials.

PART 1918—LONGSHORING

SUBPART E—OPENING AND CLOSING HATCHES

1918.41 Coaming clearances.
1918.42 Beam and pontoon bridles.
1918.43 Handling beams and covers.

SUBPART E—OPENING AND CLOSING HATCHES

1918.41—COAMING CLEARANCES

(a) Weather deck: If a deck load of lumber or other smooth sided deck cargo over 5 feet high is stowed within 3 feet of the hatch coaming and employees handling beams and hatch covers are not protected by at least a 24-inch height of the coaming, a taut handline shall be provided along the side of the deckload for their protection. The requirements of § 1918.35 (a) are not intended to apply in this situation.

(b) Intermediate deck:

(1) Before intermediate deck hatch covers and beams are removed or replaced by employees, there shall be a 3-foot working space between the stowed cargo and the coaming at both sides and at one end of the hatches with athwartship beams, and at both ends of those hatches with fore and aft beams, except that a reasonable tolerance will be permitted in circumstances where adherence to a 3-foot working space would create undue hardship.

(2) The 3-foot clearance required by subparagraph (1) of this paragraph is not required on the covered portion of a partially opened hatch, nor is it required when lower decks have been filled to beam height with cargo of such a nature as to provide a safe surface upon which employees may work.

(3) For purposes of subparagraph (1) of this paragraph, banana or other fitted gratings which are in good condition shall be considered a part of the decking when properly placed within the 3-foot area.

(c) Trunk hatches and other permanent or semi-permanent structures and spare parts: When bulkheads, lockers, reefer compartments or large spare parts are within 3 feet of the coaming, grab rails or taut handlines shall be provided for the protection of employees handling beams and hatch covers.

(d) The provisions of this section regarding coaming clearances do not apply to hatches which are opened by hydraulic or other mechanical means, but in all cases in which the 3-foot clearance does not exist, means shall be taken to prevent stowed cargo which is likely to shift from falling into the hold.

1918.42—BEAM AND PONTOON BRIDLES

Beam and pontoon bridles shall not be used unless they meet the following requirements:

(a) Bridles shall be long enough to easily reach the holes, rings, or other lifting attachments on the beams and pontoons. The bridles shall be of adequate strength and properly maintained, including covering or blunting of protruding ends in wire rope splices.

(b) Bridles for lifting hatch beams shall be equipped with toggles, shackles, or hooks or other devices of such design that they cannot become accidentally dislodged from the beams with which they are used. Hooks other than those herein described may be used only when they are hooked into the standing part of the bridle. Toggles, when used, shall be at least 1 inch longer than twice the longest diameter of the holes into which they are placed.

(c) Bridles used for lifting pontoons and plugs shall have the number of legs required by the design of the pontoon or plug, and all legs shall be used. Where any use of a bridle requires fewer than the number of legs provided, idle legs shall be hung on the hook or ring, or otherwise prevented from swinging free.

(d) At least two legs of all strongback and pontoon bridles shall be equipped with a substantial fiber rope lanyard at least 8 feet long and in good condition. The bridle end of the lanyard may be of chain or wire.

1918.43—HANDLING BEAMS AND COVERS

Only paragraph (f)(2), (h), and (i) of this section apply to folding, sliding, or hinged metal hatch covers or to those hatch covers handled by cranes carried for that purpose.

(a)

(1) When hatch covers or pontoons are stowed on the weather deck abreast of hatches they shall be arranged in stable piles not closer than 3 feet from the hatch coaming and, when on the working side of the deck, not higher than the coaming, unless they are spread one high between coaming and rail with no space between them and with not less than a 24-inch height of hatch coaming maintained.

(2) When, in the case of pontoons, the requirements of subparagraph (1) of this paragraph cannot be met due to the narrowness of the available deck area, pontoons may be stowed more than one high against the coaming, provided that not less than a 24-inch height of hatch coaming is maintained on the working side of the vessel. If pontoons must be stowed closer than 3 feet to and higher than the coaming on the idle side, they shall be secured against movement.

(3) When some, but not all, conventional small weather deck hatch boards or similar covers on seagoing vessels are removed from the beams in a section of a partially opened hatch during cargo handling, cleaning or other operations, those removed shall not be stowed on those left in place within that section.

(b) Beams shall be laid on their sides, or stood on edge close together and lashed: *Provided, however*, That this paragraph shall not apply in cases where beams are of such design that (1) the width of the flange is 50 percent or more of the height of the web and (2) that when a beam is stood upright the flange rests flat on the deck.

(c) Strongbacks, hatch covers and pontoons shall be so placed as not to interfere with a safe walkway from rail to hatch coaming or fore and aft, and so secured that they cannot be tipped over or dragged into hatches or overboard by drafts or gear. Dunnage or other suitable material shall be used under and between tiers of strongbacks and pontoons.

(d) Hatch covers unshipped in an intermediate deck shall be placed at least 3 feet from the coaming or they shall be removed to another deck. Strongbacks unshipped in an intermediate deck shall not be placed closer than 6 inches to the coaming, and if placed closer than 3 feet, they shall be so secured that they cannot be tipped or dragged into a lower compartment. If this is not possible they shall be removed to another deck.

(e) Any beam or pontoon left in place adjacent to a section through which cargo, dunnage, equipment, or any other material is being worked, shall be lashed, locked, or otherwise secured so that it cannot be displaced by accident. All portable, manually handled hatch covers, including those bound together to make a larger cover, shall be removed from any working section.

(f)

(1) The roller hatch beam at the edge of the open section of the hatch shall be lashed or pinned back so that it cannot be moved toward the open section.

(2) Rolling, sectional or telescopic hatch covers of barges which open in a fore and aft direction shall be secured against unintentional movement while in the open position.

(g) When a hatch is to be covered, hatch covers or night tents shall be used. Any partial hatch covering, such as alternate hatch covers or strips of dunnage, shall not be covered by a tarpaulin.

(h) Hinged or folding hatch covers normally stowed in an approximately vertical position shall be positively secured when in the upright position.

(i) Hatches shall not be opened or closed while employees are in the square of the hatch below.

PART 1918—LONGSHORING

SUBPART F—SHIP'S CARGO HANDLING GEAR

1918.51 General requirements.
1918.52 Specific requirements.
1918.53 Cargo winches.
1918.54 Rigging gear.
1918.55 Cranes.

SUBPART F—SHIP'S CARGO HANDLING GEAR

1918.51—GENERAL REQUIREMENTS[3]

INTERP

(a) Neither the safe working load as specified in the cargo gear certification papers, nor any safe working load marked on the booms, shall be exceeded. Any limitations imposed by the certificating authority shall be adhered to.

INTERP

(b) Any component of cargo handling gear, including tent gantlines and other associated rigging, which is visibly unsafe shall not be used until made safe.

(c) The following limitations shall apply to the use of wire rope as a part of the ship's cargo handling gear:

(1) An eye splice made in any wire rope shall have not less than three full tucks. However, this requirement shall not operate to preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited;

(2) Except for eye splices in the ends of wires, each wire rope used in hoisting or lowering, in guying derricks, or as a topping lift, preventer, segment of a multipart preventer, or pendant, shall consist of one continuous piece without knot or splice; and

(3) Wire rope shall not be used for the ship's cargo gear if, in any length of 8 diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires or if the rope shows other signs of excessive wear, corrosion or defect.

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[3] See also § 1918.12.

1918.52—SPECIFIC REQUIREMENTS

Gear which does not comply with the following requirements shall not be used:

(a) Preventers.

(1) When preventers are used they shall be of sufficient strength for the intended purpose and secured to the head of the boom independent of working guys except when, in the case of cast fittings, the strength of the fitting exceeds the total strength of all lines secured to it. Any tails, fittings, or other means of making the preventers fast on deck shall provide strength equal to that of the preventer itself.

(2) Wire rope clips or knots shall not be used to form eyes in, or to join sections of, preventer guys.

(b) Stoppers.

(1) When used, chain topping lift stoppers shall be in good condition, equipped with manila tails, and of a length to allow not fewer than three half-hitches in the chain.

(2) When used, chain stoppers shall be shackled or otherwise secured in such a manner that their links are not bent by being passed around fittings. The point of attachment shall be of sufficient strength and so located that the stoppers are reasonably in line with the normal topping lift lead at the time the stopper is applied.

(3) When used, patent stoppers of the clamp type shall be suited to the size of the rope used. Clamps shall be in good condition and free of paint and dirt which would prevent their being drawn tight.

(c) Falls.

(1) The end of the winch fall shall be secured to the drum by clamps, U-bolts, shackles, or some other equally strong method. Fiber rope fastenings shall not be used.

(2) Winch falls shall not be used with fewer than three turns on the winch drum.

(3) Eyes in the ends of wire rope cargo falls shall not be formed by knots and, in single part falls, shall not be formed by wire rope clips.

(4) When the design of the winch permits, the fall shall be so wound on the drum that the control mechanism moves in the same direction as the load.

(d) Heel blocks.

(1) When employees are required to work in the bight formed by the heel block, a preventer of at least $\frac{3}{4}$-inch diameter wire rope, rove reasonably snug and adequately secured, shall be rigged, or equally effective means shall be taken to hold the block and fall in the event that the heel block attachments should fail. Where physical limitations prohibit the fitting of a wire rope preventer of the required size or of other equally effective means, the maximum possible protection shall be provided.

(2) If the heel block is not so rigged as to prevent its falling when not under strain, it shall be secured to prevent alternate raising and dropping of the block: *Provided, however*, That this requirement shall not apply when the heel block is so located as to be at least 10 feet above the deck when at its lowest point.

(e) Coaming rollers.

When used, portable coaming rollers, whether provided by the ship or by the employer, shall be secured by wire preventers in addition to the regular coaming clamps.

(f) Cargo hooks.

Cargo hooks shall be as close to the junction of the falls as the assembly permits, but in no case farther than two feet from it, except that this provision shall not apply when the construction of the vessel and the operation in progress are such that fall angles in excess of 120 degrees do not normally occur. Overhaul chains shall not be shortened by bolting or knotting.

1918.53—CARGO WINCHES

(a) General.

(1) When moving parts of winches or other deck machinery present a hazard, they shall be guarded.

(2) Winches shall not be used if control levers operate with excessive friction or excessive play.

(3) Double gear winches or other winches equipped with a clutch shall not be used unless a positive means of locking the gear shift is provided.

(4) When changing gears on a two gear winch, there shall be no load other than the fall and cargo hook assembly on the winch.

(5) Any defect or malfunction of winches shall be reported immediately to the officer in charge of the vessel.

(6) Temporary seats and shelters for winch drivers which create a hazard to the winchmen or other employees shall not be used.

(7) Except for short handles on wheel type controls, winch drivers shall not be permitted to use winch control extension levers unless they are provided by either the ship or the employer. Such levers shall be of adequate strength and securely fastened with metal connections at the fulcrum and at the permanent control lever.

(b) Steam winches.

(1) Means shall be taken to prevent escaping steam from obscuring any part of the decks or other work places or from otherwise hindering or injuring any employee.

(2) Access shall be maintained to the steam valve between each winch and the deck steam line. If this valve is not operative with normal hand pressure, the winch shall not be used.

(3) Extension control levers which tend to fall of their own weight shall be counterbalanced.

(4) When winches are left unattended, control levers shall be secured in the neutral position.

(c) Electrical winches.

(1) When the electromagnetic or other service brake is unable to hold the load, the winch shall not be used.

(2) Winches shall not be used when one or more control points, either hoisting or lowering, is not operating properly. Employees shall not be permitted to tamper with or adjust electric control circuits.

(3) When winches are left unattended, control levers shall be placed in the neutral position and, whenever possible, the power shall be shut off or control levers locked at the winch or the operating controls.

1918.54—RIGGING GEAR

(a) When alternate positions for securing guys are provided, the guys shall be so placed as to produce a minimum stress without permitting the boom to jackknife.

(b) The head of the midship boom shall be spotted no farther outboard of the coaming than is necessary for control of the load.

(c) Preventers: When preventers are used, the following shall apply:

(1) Preventers shall be properly secured to suitable fittings, other than those to which the guys are secured, and shall be as nearly parallel to the guys as available fittings permit.

(2) Unless the cleat is also a chock and the hauling part is led through the chock opening, the leads of preventers to cleats shall be such that the direction of the line pull of the preventer is as nearly as possible parallel to the plane of the surface on which the cleat is mounted.

(3) Guys and associated preventers shall be adjusted so as to share the load as nearly equally as practicable where cargo operations are being conducted by burtoning: *Provided, however,* That where guys are designed and intended for trimming purposes only and the preventer is intended to perform the function of the guy, the guy shall be left slack.

(d) Cargo falls under load shall not be permitted to chafe on any standing or other running rigging: *Provided, however,* That this shall not be construed to mean hatch coamings or other similar structural parts of the vessel.

(e)

(1) Where a bull wire is taken to a gypsy head for the purpose of lowering or topping a boom, the bull wire shall be secured to the gypsy head by shackle or other equally strong method. Securing by fiber rope fastening will not be considered adequate.

(2) When, in lowering or topping a boom, it is not possible to secure the bull wire to the gypsy head, or when the topping lift itself is taken to the gypsy head, sufficient turns, in no case less than five (5), shall be used.

(f) When deck loads extend above the rail and there is less than 8 inches horizontal clearance between the edge of the deck load and the inside of the bulwark or rail, employees shall not be permitted to go overside unless adequate precautions are taken to prevent them from falling.

1918.55—CRANES

Unless permanently guarded, the accessible areas within the swing radius of the outermost part of the body of a revolving crane shall be temporarily guarded by ropes or other suitable means during cargo operations, so as to prevent an employee being in a position to be caught between the body of the crane and fixed parts of the vessel or of the crane itself.

PART 1918—LONGSHORING

SUBPART G—CARGO HANDLING GEAR AND EQUIPMENT OTHER THAN SHIP'S GEAR

1918.61 General.
1918.62 Fiber rope and fiber rope slings.
1918.63 Wire rope and wire rope slings.
1918.64 Chains and chain slings.
1918.65 Shackles.
1918.66 Hooks other than hand hooks.
1918.67 Pallets.
1918.68 Chutes, gravity conveyors and rollers.
1918.69 Powered conveyors.
1918.70 Portable stowing winches.
1918.71 Rain tents.
1918.72 Tools.
1918.73 Mechanically-powered vehicles used aboard vessels.
1918.74 Cranes and derricks other than vessel's gear.
1918.75 Notifying ship's officers before using certain equipment.
1918.76 Grounding.

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SUBPART G—CARGO HANDLING GEAR AND EQUIPMENT OTHER THAN SHIP'S GEAR

1918.61—GENERAL

(a) All gear and equipment provided by the employer shall be inspected by the employer or his authorized representative before each use and, when necessary, at intervals during its use, to ensure that it is safe. Any gear which is found upon such inspection to be visibly unsafe shall not be used until it is made safe.

(b) All special stevedoring gear provided by the employer, the strength of which depends upon components other than commonly used stock items such as shackles, ropes or chains, shall be tested as a unit in the following manner before initially being put into use:

(1) Gear intended to handle lifts up to and including 20 short tons (40,000 lbs.) shall be tested to 25 percent in excess of its safe working load.

(2) Gear intended to handle lifts over 20 short tons (40,000 lbs.) but not exceeding 50 short tons (100,000 lbs.) shall be tested to 5 short tons (10,000 lbs.) in excess of its safe working load.

(3) Gear intended to handle lifts over 50 short tons (100,000 lbs.) shall be tested to 10 percent in excess of its safe working load.

(4) The employer shall maintain a record of the dates and results of the tests with each unit of gear concerned clearly identifiable. The records shall be available for examination by representatives of the Occupational Safety and Health Administration.

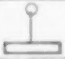
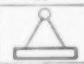
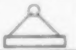
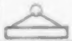
(c) The safe working load of gear as specified in §§ 1918.61 through 1918.66 shall not be exceeded.

(d) The weight shall be plainly marked on any article of stevedoring gear hoisted by ship's gear and weighing in excess of 2,000 lbs.

1918.62—FIBER ROPE AND FIBER ROPE SLINGS

(a) Table G-1 shall be used to determine the safe working load of various sizes of manila rope and rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

TABLE G-1
MANILA ROPE
(In pounds or tons of 2000 pounds)

Circumference	Diameter in Inches	Single Leg	60°	45°	30°
					
3/4	1/4	120 lbs.	204 lbs.	170 lbs.	120 lbs.
1	5/16	200	346	282	200
1-1/8	3/8	270	467	380	270
1-1/4	7/16	350	605	493	350
1-3/8	15/32	450	775	635	450
1-1/2	1/2	530	915	798	530
1-3/4	9/16	690	1190	973	690
2	5/8	880	1520	1240	880
2-1/4	3/4	1080	1870	1520	1080
2-1/2	13/16	1300	2250	1830	1300
2-3/4	7/8	1540	2660	2170	1540
3	1	1800	3120	2540	1800
3-1/4	1-1/16	1.0 Tons	1.7 Tons	1.4 Tons	1.0 Tons
3-1/2	1-1/8	1.2	2.1	1.7	1.2
3-3/4	1-1/4	1.35	2.3	1.9	1.35
4	1-5/16	1.5	2.6	2.1	1.5
4-1/2	1-1/2	1.8	3.1	2.5	1.8
5	1-5/8	2.25	3.9	3.2	2.25
5-1/2	1-3/4	2.6	4.5	3.7	2.6
6	2	3.1	5.4	4.4	3.1
6-1/2	2-1/8	3.6	6.2	5.1	3.6

(b) Where synthetic fiber ropes are substituted for manila ropes of less than three (3) inches circumference, the substitute shall be of equal size. Where synthetic fiber ropes are substituted for manila ropes of three (3) inches circumference or more, the size of the synthetic rope is to be determined from the formula:

$$C = \sqrt{0.6C_s^2 + 0.4C_m^2}.$$

Where C = the required circumference of the synthetic rope in inches.

C_s = the circumference to the nearest one-quarter inch of a synthetic rope having a breaking strength not less than the breaking strength of the size manila rope that would be required by paragraph (a) of this section.

C_m = the circumference of manila rope in inches which would be required by paragraph (a) of this section.

In making such a substitution it should be ascertained that the inherent characteristics of the synthetic fiber are suitable for the intended service of the rope.

1918.63—WIRE ROPE AND WIRE ROPE SLINGS

(a) Tables G–2 through G–5 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than five (5) is maintained.

TABLE G-2

RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE WIRE ROPE AND WIRE ROPE SLINGS

(In tons of 2000 pounds)

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6x19 CLASSIFICATION						
1/4"	.59	.56	.53	.44	.42	.40
3/8"	1.3	1.2	1.1	.98	.93	.86
1/2"	2.3	2.2	2.0	1.7	1.6	1.5
5/8"	3.6	3.4	3.0	2.7	2.5	2.2
3/4"	5.1	4.9	4.2	3.8	3.6	3.1
7/8"	6.9	6.6	5.5	5.2	4.9	4.1
1"	9.0	8.5	7.2	6.7	6.4	5.4
1-1/8"	11.	10.	9.0	8.5	7.8	6.8
6x37 CLASSIFICATION						
1-1/4"	13.	12.	10.	9.9	9.2	7.9
1-3/8"	16.	15.	13.	12.	11.	9.6
1-1/2"	19.	17.	15.	14.	13.	11.
1-3/4"	26.	24.	20.	19.	18.	15.
2"	33.	30.	26.	25.	23.	20.
2-1/4"	41.	38.	33.	31.	29.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-3

RATED CAPACITIES FOR IMPROVED PLOW STEEL, INDEPENDENT WIRE ROPE CORE, WIRE ROPE SLINGS

(In tons of 2000 pounds)

Rope Dia. Inches	TWO - LEG BRIDLE OR BASKET HITCH											
	Vertical			60°			45°			30°		
	A	B	C	A	B	C	A	B	C	A	B	C
	6x19 CLASSIFICATION											
1/4"	1.2	1.1	1.0	1.0	.97	.92	.83	.79	.75	.59	.56	.53
3/8"	2.6	2.5	2.3	2.3	2.1	2.0	1.8	1.8	1.6	1.3	1.2	1.1
1/2"	4.6	4.4	3.9	4.0	3.8	3.4	3.2	3.1	2.8	2.3	2.2	2.0
5/8"	7.2	6.8	6.0	6.2	5.9	5.2	5.1	4.8	4.2	3.6	3.4	3.0
3/4"	10.	9.7	8.4	8.9	8.4	7.3	7.2	6.9	5.9	5.1	4.9	4.2
7/8"	14.	13.	11.	12.	11.	9.6	9.8	9.3	7.8	6.9	6.6	5.5
1"	18.	17.	14.	15.	15.	12.	13.	12.	10.	9.0	8.5	7.2
1-1/8"	23.	21.	18.	19.	18.	16.	16.	15.	13.	11.	10.	9.0
	6x37 CLASSIFICATION											
1-1/4"	26.	24.	21.	23.	21.	18.	19.	17.	15.	13.	12.	10.
1-3/8"	32.	29.	25.	28.	25.	22.	22.	21.	18.	16.	15.	13.
1-1/2"	38.	35.	30.	33.	30.	26.	27.	25.	21.	19.	17.	15.
1-3/4"	51.	47.	41.	44.	41.	35.	36.	33.	29.	26.	24.	20.
2"	66.	61.	53.	57.	53.	46.	47.	43.	37.	33.	30.	26.
2-1/4"	83.	76.	66.	72.	66.	57.	58.	54.	47.	41.	38.	33.

(A) - Socket or Swaged Terminal Attachment.
(B) - Mechanical Sleeve Attachment.
(C) - Hand Tucked Splice Attachment.

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TABLE G-4

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE AND WIRE ROPE SLINGS

(In tons of 2000 pounds)

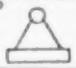
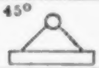
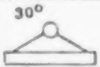
Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
	6x19 CLASSIFICATION					
1/4	.55	.51	.49	.41	.38	.37
3/8	1.2	1.1	1.1	.91	.85	.80
1/2	2.1	2.0	1.8	1.6	1.5	1.4
5/8	3.3	3.1	2.8	2.5	2.3	2.1
3/4	4.8	4.4	3.9	3.6	3.3	2.9
7/8	6.4	5.9	5.1	4.8	4.5	3.9
1	8.4	7.7	6.7	6.3	5.8	5.0
1-1/8	10.	9.5	8.4	7.9	7.1	6.3
	6x37 CLASSIFICATION					
1-1/4	12.	11.	9.8	9.2	8.3	7.4
1-3/8	15.	13.	12.	11.	10.	8.9
1-1/2	17.	16.	14.	13.	12.	10.
1-3/4	24.	21.	19.	18.	16.	14.
2	31.	28.	25.	23.	21.	18.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TABLE G-5

RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE SLINGS

(In tons of 2000 pounds)

TWO - LEG BRIDLE OR BASKET HITCH												
Rope Dia. Inches	Vertical			60° 			45° 			30° 		
	A	B	C	A	B	C	A	B	C	A	B	C
6x19 CLASSIFICATION												
1/4	1.1	1.0	.99	.95	.88	.85	.77	.72	.70	.55	.51	.49
3/8	2.4	2.2	2.1	2.1	1.9	1.8	1.7	1.6	1.5	1.2	1.1	1.1
1/2	4.3	3.9	3.7	3.7	3.4	3.2	3.0	2.8	2.6	2.1	2.0	1.8
5/8	6.7	6.2	5.8	5.8	5.3	4.8	4.7	4.4	4.0	3.3	3.1	2.8
3/4	9.5	8.8	7.8	8.2	7.6	6.8	6.7	6.2	5.5	4.8	4.4	3.9
7/8	13.	12.	10.	11.	10.	8.9	9.1	8.4	7.3	6.4	5.9	5.1
1	17.	15.	13.	14.	13.	11.	12.	11.	9.4	8.4	7.7	6.7
1-1/8	21.	19.	17.	18.	16.	14.	15.	13.	12.	10.	9.5	8.4
6x37 CLASSIFICATION												
1-1/4	25.	22.	20.	21.	19.	17.	17.	16.	14.	12.	11.	9.8
1-3/8	30.	27.	24.	26.	23.	20.	21.	19.	17.	15.	13.	12.
1-1/2	35.	32.	28.	30.	27.	24.	25.	22.	20.	17.	16.	14.
1-3/4	48.	43.	38.	41.	37.	33.	34.	30.	27.	24.	21.	19.
2	62.	55.	49.	53.	48.	43.	43.	39.	35.	31.	28.	25.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

(b) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(c) Where "U" bolt wire rope clips are used to form eyes, Table G-6 shall be used to determine the number and spacing of clips. The "U" bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

TABLE G-6—NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel, rope diameter, inches	Number of clips		Minimum spacing, inches
	Drop forged	Other material	
•			
½	3	4	3
⅝	3	4	3¾
¾	4	5	4½
⅞	4	5	5¼
1	4	6	6
1⅛	5	6	6¾
1¼	5	7	7½
1⅜	6	7	8¼
1½	6	8	9

• Three clips shall be used on wire size less than ½-inch diameter.

(d) Wire rope shall not be secured by knots, except on haul back lines on scrapers.

(e) The following limitations shall apply to the use of wire rope:

(1) An eye splice made in any wire rope shall have not less than three full tucks. However, this requirement shall not operate to preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.

(2) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in bulling cargo, shall consist of one continuous piece without knot or splice.

(3) Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.

(4) Wire rope shall not be used as cargo handling gear if, in any length of eight diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires or if the rope shows other signs of excessive wear, corrosion or defect.

1918.64—CHAINS AND CHAIN SLINGS

(a) Tables G–7 and G–8 shall be used to determine the maximum safe working loads of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products. Proof coil steel chain, also known as common or hardware chain, or other chain not recommended for slinging or hoisting by the manufacturer, shall not be used for hoisting purposes.

TABLE G-7
WROUGHT IRON CHAIN
(In pounds or tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
* 1/4	1060	1835	1500	1060
* 5/16	1655	2865	2340	1655
3/8	2385	2.1	3370	2385
* 7/16	3250	2.8	2.3	3250
1/2	2.1	3.7	3.0	2.1
* 9/16	2.7	4.6	3.8	2.7
5/8	3.3	5.7	4.7	3.3
3/4	4.8	8.3	6.7	4.8
7/8	6.5	11.2	9.2	6.5
1	8.5	14.7	12.0	8.5
1-1/8	10.0	17.3	14.2	10.0
1-1/4	12.4	21.4	17.5	12.4
1-3/8	15.0	25.9	21.1	15.0
1-1/2	17.8	30.8	25.2	17.8
1-5/8	20.9	36.2	29.5	20.9
1-3/4	24.2	42.0	34.3	24.2
1-7/8	27.6	47.9	39.1	27.6
2	31.6	54.8	44.8	31.6

* These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8
ALLOY STEEL CHAIN
(In tons of 2000 pounds)

Nominal Size Chain Stock Inch.	Single Leg	60°	45°	30°
1/4	1.62	2.82	2.27	1.62
3/8	3.30	5.70	4.65	3.30
1/2	5.62	9.75	7.90	5.62
5/8	8.25	14.25	11.65	8.25
3/4	11.5	19.9	16.2	11.5
7/8	14.3	24.9	20.3	14.3
1	19.3	33.5	27.3	19.8
1-1/8	22.2	38.5	31.5	22.2
1-1/4	28.7	49.7	40.5	28.7
1-3/8	33.5	58.0	47.0	33.5
1-1/2	39.7	68.5	56.0	39.7
1-5/8	42.5	73.5	59.5	42.5
1-3/4	47.0	81.5	62.0	47.0

(b) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(c) Interlink wear, not accompanied by stretch in excess of five (5) percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G–9, has been reached.

TABLE G-9

MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in fraction of inches
1/4 (9/32)	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	11/32

(d) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(e) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective, as described in paragraph (d) of this section, shall be replaced by links having proper dimensions and made of material similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(f) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding 6 months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall not be annealed.

(g) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

1918.65—SHACKLES

(a) Table G–10 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than five (5) is maintained.

(b) Screw pin shackles provided by the employer and used aloft, except in cargo hook assemblies, shall have their pins moused.

TABLE G-10

SAFE WORKING LOADS FOR SHACKLES

[In tons of 2000 pounds]

Material size (inches)	Pin diameter (inches)	Safe working load
½	⅝	1.4
⅝	¾	2.2
¾	⅞	3.2
⅞	1	4.3
1	1⅛	5.6
1⅛	1¼	6.7
1¼	1⅜	8.2
1⅜	1½	10.0
1½	1⅝	11.9
1¾	2	16.2
2	2¼	21.2

1918.66—HOOKS OTHER THAN HAND HOOKS

(a) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employers shall maintain a record of the dates and results of such tests.

(b) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(c) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

(d) Teeth of case hooks shall be kept in good condition.

(e) Jaws of patent clamp type plate hooks shall be kept in safe condition so that they will grip plates securely.

1918.67—PALLETS

(a) Pallets shall be of such material and construction and so maintained as to safely support and carry loads being handled on them. Fastenings of reusable pallets shall be bolts and nuts, drive screws (helically threaded nails), annular threaded nails or fastenings of equivalent strength.

(b) Wing or lip type pallets hoisted by means of bar bridles shall have an overhanging wing or lip at least 3 inches long.

(c) Loaded pallets which on visual examination do not meet the requirements of this section, shall be placed on pallets meeting the requirements before being hoisted into or out of the vessel.

(d) Bridles used to handle flush end or box type pallets shall be of such a design as to prevent them from becoming disengaged from the pallet under load.

1918.68—CHUTES, GRAVITY CONVEYORS AND ROLLERS

(a) Chutes used in the manual handling of cargo shall be of adequate length and strength for the use to which they are put and shall be kept free of splinters and sharp edges.

(b) Chutes shall be equipped with sideboards of sufficient height to prevent cargo from falling off.

(c) Chutes and gravity roller sections shall be firmly placed or secured to prevent displacement.

(d) Gravity rollers shall be of sufficient strength for the weight of material which is placed upon them. Rollers shall be locked in position to prevent them from falling or jumping out of the frame.

(e) Frames shall be kept free of burrs and sharp edges.

(f) When necessary for safe operation, provision shall be made for braking objects at the delivery end of the roller or chute.

1918.69—POWERED CONVEYORS

(a) Readily accessible stop controls shall be provided for use in an emergency. Whenever the operation of any power conveyor requires personnel to work in the immediate vicinity of the conveyor, the conveyor controls shall not be left unattended while the conveyor is in operation.

(b) Electric motors and controls on grain trimmers shall be of the explosion-proof type approved by the Underwriters' Laboratories, Incorporated, for use in hazardous locations, Class II, Group G.

(c) All conveyor and trimmer drives which create a hazard shall be adequately guarded.

(d) Each grain trimmer shall have a control box located on the weather deck in close proximity to the spout feeding the trimmer.

(e) Power cables between the deck control box and the grain trimmer shall be used only in continuous lengths without splice or tap between connections.

1918.70—PORTABLE STOWING WINCHES

(a) Portable stowing winches shall be used only with the knowledge and consent of the officer in charge of the vessel.

(b) Portable stowing winches used in connection with operations shall at all times be properly secured to prevent shifting.

(c) When internal combustion powered stowing winches are located below the weather deck or in other enclosed spaces, the exhaust shall be led topside to open air and away from the hatch opening.

1918.71—RAIN TENTS

When using rain tents, lanyards shall be secured to padeyes or other fixed structures of the vessel which are strong enough or to objects which are heavy enough to withstand the breaking stress of all lanyards attached.

1918.72—TOOLS

(a) General.

Employers shall not issue or permit the use of visibly unsafe tools.

(b) Portable electric tools.

(1) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in a closed position.

(2) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

1918.73—MECHANICALLY-POWERED VEHICLES USED ABOARD VESSELS

(a) All automotive equipment shall be maintained in good working order and safety devices shall not be removed or made inoperative, except as otherwise provided.

(b) Overhead guards for fork lift trucks:

(1) Except as noted in subparagraph (5) of this paragraph, fork lift trucks shall be equipped with overhead guards securely attached to the machines. The guards shall be of such design and construction as to protect the operator from boxes, cartons, packages, bagged material, and other similar individual items of cargo which may fall from the load being handled or from stowage.

(2) The guard shall be of such construction that it does not interfere with good visibility, but openings in the top of the guard must not exceed six inches in one of the two dimensions, width or length. Larger openings may be permitted provided no opening is larger than the smallest unit of cargo that is likely to fall on the guard.

(3) The guard shall be large enough to extend over the operator in all normal circumstances of truck operation, including forward tilt.

(4) In fork lift trucks equipped with a single tilt cylinder, provision shall be made so that failure of this cylinder or associated parts will not cause the overhead guard to injure the operator.

(5) The overhead guard may be removed only at times when the construction of the truck is such that the presence of such a guard would prevent the truck from entering working spaces, and if the operator cannot be injured by low overhead obstructions.

(c) Guards for bulk cargo-moving vehicles:

(1) Every crawler type, rider operated, bulk cargo-moving vehicle shall be equipped with an operator's guard of such design and construction as to protect the operator, when seated, against injury from contact with a projecting overhead.

(2) Guards and their attachment points shall be so designed as to be able to withstand, without excessive deflection, a load applied horizontally at the operator's shoulder level equal to the drawbar pull of the machine.

(3) Guards shall not be required when the vehicle is used in situations in which the possibility of the seated operator coming in contact with projecting overheads does not exist.

(d) End platform guards.

(1) Every truck operated from an end platform or pedal position shall be equipped with an operator's platform guard of such design that it permits rapid and unobstructed egress.

(2) Guards shall be so designed as to be able to withstand, without excessive deflection, a load equal to the weight of the loaded machine.

(e) Forks, fork extensions or other attachments shall be suitably secured to prevent unintentional disengagement.

(f) Weights and loads:

(1) The vehicle weight, with and without removable counterweights, shall be clearly posted on all mechanically-powered vehicles which are lifted aboard vessels.

(2) The rated capacity of every fork lift trucks, with and without removable counterweights, shall be posted on the vehicle in such a manner as to be readily visible to the operator.

(3) Loads in excess of the rated capacity shall not be lifted or carried by lift trucks.

(4) If loads are lifted by two or more trucks working in unison, the total weight shall not exceed the combined safe lifting capacity of all the trucks.

(g)

(1) Steering knobs, when furnished on vehicles where the driver is not in a sitting position, shall be of a mushroom type unless the steering mechanism is of a type that prevents road reactions from causing the steering handwheel to spin. The steering knob shall be mounted within the periphery of the wheel.

(2) Steering knobs or similar ancillary devices shall not be used on the steering wheels of trucks in which the driver is in a sitting position.

(h) No load on a fork lift truck or industrial crane truck shall be suspended or swung over any employee.

(i) When mechanically-powered vehicles are used, adequate provisions shall be made to ensure that the working surface can support the vehicle and load, and that hatch covers, truck plates, or other temporary surfaces cannot be dislodged by movement of the vehicle.

(j) When mechanically-powered vehicles are left unattended, the controls shall be neutralized, power shut off, brakes set, and the forks, blade, or scoop shall be placed in the lowered position.

(k) When lift trucks or other mechanically powered vehicles are being operated on open deck type barges, the edges of the barges shall be suitably guarded by railings, sideboards, timbers or other means sufficient to prevent vehicles from rolling overboard. When operated on covered lighters where door openings other than those being used are left open, adequate means shall be taken as necessary to prevent vehicles from rolling overboard through such openings.

1918.74—CRANES AND DERRICKS OTHER THAN VESSEL'S GEAR

(a) The following requirements shall be met in the use of cranes, whether hoisted aboard a vessel for use thereon or used to service a vessel from the dock, shore, or another vessel, and in the use of any other crane or derrick not a part of a vessel's permanent equipment, but used in longshoring operations:

(1) The crane weight shall be posted on all mobile cranes hoisted aboard vessels for temporary use thereon.

(2) All types of cranes shall be equipped with a durable rating chart visible to the operator, covering the complete range of the manufacturer's (or design) capacity ratings and for which they are certified, where required. The rating chart shall include all operating radii for all permissible boom lengths and jib lengths as applicable, with and without outriggers which may be fitted, and alternate ratings with optional equipment affecting such ratings. Necessary precautions or warnings shall be included. Operating controls shall be marked, or an explanation posted, at the operator's position to indicate function.

(3) A boom angle or radius indicator shall be fitted where applicable.

(4) All shore-based derricks shall be clearly marked to indicate all applicable capacity ratings, based on manufacturer's (or design) data for which certificated. Such ratings, and any necessary precautions or warnings shall be visible to the operator. Operating controls shall be marked, or an explanation posted at the operator's position to indicate function.

(5) The rated safe working loads of each crane and derrick, for the conditions of use, shall not be exceeded.

(6) No counterweights in excess of manufacturer's (or design) specifications shall be fitted. All equipment shall be used in accordance with manufacturer's (or design) specifications and recommendations.

(7) Pulling of barges or rail cars, and bulling of cargo in such a way as to exert side loading stresses upon crane booms shall not be permitted.

(8) No crane or derrick shall be used in any case where a visible defect affecting safe use exists.

(9) Unless exempted by the provisions of subdivision (viii) of this subparagraph, every crane used to load or discharge cargo into or out of a vessel shall be fitted with a load indicating device or alternative device in proper working condition which shall meet the following criteria: INTERP

(i) The type or model of any load indicating device which is used may be such as to provide (*a*) a direct indication in the cab of actual weight hoisted or a means of determining this by reference to crane ratings posted and visible to the operator, except that the use of a dynamometer or simple scale alone will not meet this requirement; or (*b*) an automatic weight-moment device or computer providing indications in the cab according to the radius and load at the moment; or alternatively (*c*) a device may be used which shall prevent an overloaded condition.

(ii) Accuracy of the load indicating device, weight-moment device, or overload protection device shall be such that any indicated load (or limit), including the sum of actual weight hoisted and additional equipment or "add ons" such as slings, sensors, blocks, etc., is within the range from no less than 95 percent of the actual true total load (5 percent overload) to 110 percent of the actual true total load (10 percent underload). Such accuracy shall be required over the range of the daily operating variables to be expected under the conditions of use.

(iii) The device shall permit the operator to determine before making any lift that the indicating or substitute system is operative. In the alternative, if the device is not so mounted or attached and does not include such means of checking, it shall be certified by the manufacturer to remain operable within the limits stated in subdivision (ii) of this subparagraph for a specific period of time. Checks for accuracy, using known values of load, shall be performed at the time of every certification survey (see § 1918.13) and at such additional times as may be recommended by the manufacturer.

(iv) When the load indicating device or alternative system is so arranged in the supporting system (crane structure) that its failure could cause the load to be dropped, its strength shall not be the limiting factor of the supporting system (crane structure).

(v) Marking shall be conspicuously placed giving (*a*) units of measure in pounds or both pounds and kilograms, (*b*) capacity of the indicating system, (*c*) accuracy of the indicating system, and (*d*) operating instructions and precautions. Data providing (*a*) the means of measurement (*b*) capacity of the system, (*c*) accuracy of the system; and (*d*) operating instructions and precautions shall similarly be provided in the case of systems utilizing indications other than actual weights. If the system used provides no readout, but is such as to automatically cease crane operation when the rated load limit under any specific condition of use is reached, marking shall be provided giving the make and model of device installed, a description of what it does, how it is operated, and any necessary precautions regarding the system. All weight indications, other types of loading indications, and other data required shall be readily visible to the operator.

(vi) All load indicating devices shall be operative over the full operating radius. Overall accuracy shall be based on actual applied load and not on full scale (full capacity) load. For example, if accuracy of the load indicating device is based on full scale load and the device is arbitrarily set at plus or minus 10 percent, it would accept a reading between 90,000 and 110,000 lbs., at full capacity of a machine with 100,000 lbs., maximum rating, but would also allow a reading between zero and 20,000 lbs., at that outreach (radius) at which the rating would be 10,000 lbs., capacity—an unacceptable figure. If, however, accuracy is based on actual applied load under the same conditions, the acceptable range would remain the same with the 100,000-lb. load but becomes a figure between 9,000 and 11,000 lbs., a much different and acceptable condition, at the 10,000-lb. load.

(vii) When the device uses the radius as a factor in its use or in its operating indications, the indicated radius (which may be in feet and/or meters, or degrees of boom angle, depending on the system used) shall be a figure which is within the range of a figure no greater than 110 percent of the actual radius to a figure which is no less than 97 percent of the actual (true) radius. When radius is presented in degrees, and feet or meters are required for necessary determinations, a conversion chart shall be provided.

(viii) The load indicating device requirements of this subparagraph do not apply to a crane.

(a) Of trolley equipped bridge type while handling containers known to be and identified as empty, or loaded, and in either case in compliance with the provisions of § 1918.85(b) of this part; or while hoisting other lifts by means of a lifting beam supplied by the crane manufacturer for the purpose and in all cases within the crane rating;

(b) While handling bulk commodities or cargoes by means of clamshell bucket or magnet;

(c) While used to handle or hold hoses in connection with transfer of bulk liquids or other hose handled products; or

INTERP **(d)** While the crane is used exclusively to handle cargo or equipment the total actual gross weight of which is known by means of marking of the unit or units hoisted, when such total actual gross weight never exceeds 11,200 lbs., and when 11,200 lbs., is less than the rated capacity of the crane at the maximum outreach that is possible under the conditions of use at the time.

(ix) Effective date of subparagraph (9). The provisions of this subparagraph (9) shall become effective on May 27, 1972, or at the time of the next regular certification survey subsequent to that date.

(10) Accessible areas within the swing radius of the outermost part of the body of a revolving crane shall be temporarily guarded by ropes or other suitable means during cargo operations, so as to prevent an employee being in a position to be caught between the body of the crane and fixed parts of the vessel or of the crane itself.

(11) During the hours of darkness, illumination provided shall be sufficient under the prevailing circumstances so that an operator can see clearly the work area and any signalmen associated with the operation.

(b) The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.

(c) Accessible areas within the swing radius of the outermost part of the body of a revolving crane shall be temporarily guarded by ropes or other suitable means during cargo operations, so as to prevent an employee being in a position to be caught between the body of the crane and fixed parts of the vessel or of the crane itself.

1918.75—NOTIFYING SHIP'S OFFICERS BEFORE USING CERTAIN EQUIPMENT

(a) The employer shall notify the officer in charge of the vessel before bringing aboard ship internal combustion or electric powered tools, equipment or vehicles.

(b) The employer shall also notify the officer in charge of the vessel before using the ship's electric power for the operation of any of his electric tools or equipment.

1918.76—GROUNDING

(a) The frames of portable electric equipment and tools, except double insulated tools approved by Underwriters' Laboratories, Inc., shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(b) Grounding circuits, other than by means of the structure of the vessel on which the equipment is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

PART 1918—LONGSHORING

SUBPART H—HANDLING CARGO

1918.81 Slinging.
1918.82 Building drafts.
1918.83 Stowed cargo, tiering and breaking down.
1918.84 Bulling cargo.
1918.85 Containerized cargo.
1918.86 Hazardous cargo.

SUBPART H—HANDLING CARGO[4]

1918.81—SLINGING

(a) Drafts shall be safely slung before being hoisted. Loose dunnage or debris hanging or protruding from loads shall be removed.

(b) Cargo handling bridles, such as pallet bridles, which are to remain attached to the hoisting gear while hoisting successive drafts, shall be attached by shackles, or other positive means shall be taken to prevent them from becoming accidentally disengaged from the cargo hook.

(c) Drafts of lumber, pipe, dunnage and other pieces, the top layer of which is not bound by the sling, shall be slung in such a manner as to prevent sliders. Double slings shall be used on unstrapped dunnage, except when, due to the size of hatch or deep tank openings, it is impractical to use them.

(d) Case hooks shall not be used for handling cases into or out of the vessel, unless the cases are specifically designed to be handled by this means.

(e) Bales of cotton, wool, cork, wood pulp, gunny bags or other similar articles shall not be hoisted into or out of the vessel by their straps unless the straps are of sufficient strength to support the weight of the bale and two hooks, each in a separate strap, are used.

(f) Loads requiring continuous manual guidance while in motion shall be provided with tag lines.

(g) No draft shall be hoisted unless the winch or crane operator(s) can clearly see the draft itself or see the signals of any signalman associated with the operation.

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[4] 46 CFR Parts 146–147 contains regulations of the U.S. Coast Guard pertaining to the handling of explosives and other dangerous cargo.

1918.82—BUILDING DRAFTS

(a) Drafts shall be so built or such means shall be taken as to prevent cargo from falling from the draft.

(b) Hand loaded buckets or tubs used in handling bulk cargo shall not be loaded above their rims.

1918.83—STOWED CARGO, TIERING AND BREAKING DOWN

(a) When necessary, cargo shall be secured or blocked to prevent its shifting or falling.

(b) In breaking down, precautions shall be taken, when necessary, to prevent the remaining cargo from falling.

(c) Employees trimming bulk cargo shall be checked in and out by the foreman. Before securing any reefer compartment, a check shall be made to ensure that no employee remains inside. Frequent checks shall be made to ensure the safety of any employee working alone in a tank or cargo compartment.

1918.84—BULLING CARGO

(a) Bulling cargo shall be done with the bull line led directly from the heel block, except that bulling may be done from the head of the boom when the nature of the cargo and the surface over which it is dragged are such as to avoid stalling the load, or when the winch actually does not have sufficient strength, with the purchase used, to overload the boom.

(b) Snatch blocks shall be used to provide a fair lead for the bull line so as to avoid unnecessary dragging of the bull line against coamings and obstructions.

(c) Falls led from cargo booms of vessels shall not be used to move scows, lighters or railroad cars.

(d) Snatch blocks shall not be used with the point of the hook resting on the flange of a beam, but shall be hung from padeyes, straps or beam clamps. Snatch blocks or straps shall not be made fast to batten cleats or other insecure fittings.

(e) Beam or frame clamps shall be so secured to the beam as to minimize the possibility of their slipping, falling or being pulled from the beam.

1918.85—CONTAINERIZED CARGO

(a) On every cargo container there shall be permanently marked in pounds (1) the weight of the container when empty, (2) the maximum cargo weight that the container is intended and designed by its manufacturer to carry, and (3) the sum of these two weights.

(b) No container shall be loaded aboard or discharged from any vessel by means of hoisting by ship's cargo handling gear or by shore crane or derrick unless the following conditions have been met:

(1) In the case of an empty container, it shall be ascertained from the carrier that such is the case and the container shall be identified before loading or discharge either by marking, in cargo stowage plans, by both means, or otherwise in such manner that every supervisor and foreman on the site and in charge of loading or discharging, and/or every crane or other hoisting equipment operator, and signalman, if any, shall be enabled to know that such container is empty.

(2) In the case of a loaded container, either the actual gross weight shall be plainly marked so as to be visible to the crane or other hoisting equipment operator or signalman, if any, and/or to every supervisor and foreman on the site and in charge of loading or discharging; or the cargo stowage plan or equivalent permanently recorded display serving the same purpose shall be provided to the crane or other hoisting equipment operator and signalman, if any, and to every supervisor and foreman on the site and in charge of loading or discharging, and contain the actual gross weight, the exact stowage position, and the serial number or other positive identification of that specific container.

(3) Every outbound loaded container received at a marine terminal ready to load aboard a vessel without further consolidation or loading shall be weighed to obtain the actual gross weight, either at the terminal or elsewhere before loading aboard a vessel. The open type vehicle carrying container and those built specifically and used solely for the carriage of compressed gases are excepted from this subparagraph and from subparagraphs (4) and (5) of this paragraph. INTERP

(4) When container weighing scales are located at a marine terminal, any outbound

INTERP

container with a load consolidated at that terminal shall be weighed to obtain an actual gross weight before loading aboard a vessel.

(5) When there are no container weighing scales located at a marine terminal at which outbound containers are loaded with cargo, or where container loads are completed or consolidated there or elsewhere, and no weighing facility is available and located in a reasonably accessible location, the actual gross weight may be calculated, providing that accurate weights of all contents are known and a list of same, including the empty container weight, is totaled and posted on the container in a conspicuous place with identification of the source and date of calculation. Such list of contents may refer to cartons, cases, or other means of packaging but need not specifically identify the commodity or commodities involved except as otherwise required by law. Container weights so arrived at shall be subject to random sample weight checks at the nearest weighing facility. In cases where such weight checks or experience otherwise indicate consistently inaccurate weights arrived at by this means, the weight of containers so calculated at the source from which the inaccurate weights originated may no longer be recognized as true gross weights, in which case such containers may not be loaded aboard a vessel unless actual gross weights have been obtained by weighing. This procedure shall be continued until the Administration is satisfied by reasonable experience thereunder that correct weights will be furnished. INTERP

(6) In the case of loaded inbound containers from foreign ports, they shall, if they have not been weighed, have the calculated weight posted in the manner prescribed by subparagraph (5) of this paragraph. All loaded inbound containers from foreign ports shall be subject to random sample weight checks at a time satisfactory to the Administration which may be at any time up to unloading the contents of the container at the terminal or until the container is delivered unopened to the land carrier. When such checks indicate a pattern of significant and continuing inaccuracy or when the provisions of subparagraph (7) of this paragraph are not met, such suitable means as are acceptable to the Administration to protect the safety of the workers involved shall be taken during discharge to assure safety and such means shall be continued until the Administration is satisfied by experience thereunder that correct weights will be furnished.

(7) The identification and documentation provisions of subparagraphs (1) and (2) of this paragraph shall apply to containers originating from foreign ports.

(8) Any scale used within the United States to weigh containers for the purpose of the requirements of this section shall meet the accuracy standards of the state or local public authority in which the scale is located.

(c) No container shall be hoisted if its actual gross weight exceeds the weight marked as required in paragraph (a)(3) of this section, or if it exceeds the capacity of the crane or other hoisting device intended for use, under the conditions in which said crane or other hoisting device is used. All hoisting of containers shall be by means which will safely do so without probable damage to the container, and using the lifting fittings provided.

(d) All outbound containers shall be inspected before loading for any visible defects in structural members and fittings, which would render unsafe their handling in loading. To the extent it is practicable, inbound containers shall be similarly inspected before discharge. Any outbound container found to have such a defect shall not be loaded unless the defect is first corrected. Any inbound container found to have such a defect shall either be discharged by such special means as to insure safety or shall be emptied before discharge.

(e) For the purpose of this section, the term "container" means a reusable cargo container of rigid construction and rectangular configuration, intended to contain one or more articles of cargo or bulk commodities for shipment aboard a vessel, and capable of utilization for this purpose by one or more other modes of transport without intermediate reloading. The term includes completely enclosed units, open top units, half or other fractional height units, units incorporating liquid or gas tanks, and any other variations serving the same basic purpose and fitting into the container system, demountable or with attached wheels. The term, however, does not include cylinders, drums, crates, cases, cartons, packages, sacks, unitized loads or any other of the usual forms of packaging.

1918.86—HAZARDOUS CARGO

(a) Prior to the start of cargo handling operations a responsible representative of the employer shall ascertain from labels on the cargo, from the dangerous cargo manifest, or from other shipping documents, what hazardous cargoes, if any are to be handled and the general nature of the hazard. He shall inform employees of the general nature of the hazard, the importance to the employees of preventing damage to the cargo, and the special precautions to be taken. The responsible representative of the employer aboard the vessel shall instruct the employees to notify him of any leaks or spills.

(b) Drafts of cargo ascertained by the employer to be hazardous shall be so slung and secured that neither the draft nor individual packages can fall as a result of tipping the draft or slacking the support gear.

(c) If a cargo ascertained by the employer to be hazardous is spilled or any of its containers has or develops a serious leak, the employees shall be removed from the hold or compartment until the employer has ascertained the specific hazards, has provided such personal protective equipment and clothing and such ventilation and fire protective equipment as may be necessary to avoid, or protect against, the hazard, and has instructed the employees as to the safe method of cleaning up and disposing of a spill or handling and disposing of the leaking containers. The actual work of clean up or disposal shall be carried out under the personal supervision of a responsible representative of the employer aboard the vessel.

PART 1918—LONGSHORING

SUBPART I—GENERAL WORKING CONDITIONS

1918.91 Housekeeping.
1918.92 Illumination.
1918.93 Ventilation and atmospheric conditions.
1918.94 Sanitation and drinking water.
1918.95 Longshoring operations in the vicinity of repair and maintenance work.
1918.96 First aid and life saving equipment.
1918.97 Qualifications of machinery operators.
1918.98 Grain fitting.
1918.99 Commercial diving operations.

SUBPART I—GENERAL WORKING CONDITIONS

1918.91—HOUSEKEEPING

(a) Weather deck walking and working areas shall be kept reasonably clear of lines, bridles, dunnage and all other loose tripping or stumbling hazards.

(b) Gear or equipment, when not in use, shall be removed from immediate work areas, or shall be so placed as not to present a hazard.

(c) Slippery conditions shall be eliminated as they occur.

(d) Loose paper, dunnage and debris shall be collected as the work progresses and be kept clear of the immediate work area.

(e) Dunnage shall not be placed on deck where it interferes with the free movement of the drafts.

(f) Dunnage racked against sweat battens shall not be used when the levels of such racks are above the safe reach of employees.

(g) Dunnage, hatch beams, tarpaulins or gear not in use shall be stowed no closer than 3 feet to the port and starboard sides of the weather deck hatch coaming, except that a reasonable tolerance shall be permitted where strict adherence is rendered impracticable due to the circumstances.

(h) Nails.

(1) Nails which are protruding from shoring or fencing in the immediate work areas shall be bent over or otherwise rendered harmless.

(2) Dunnage, lumber, or shoring material in which there are visibly protruding nails shall be removed from the immediate work area, or, if left in that area, the nails shall be bent over or otherwise rendered harmless.

(i) Employees shall not be exposed to ice which may fall from aloft under conditions where the accumulation of such ice and the circumstances at the time are such as to constitute a hazard.

1918.92—ILLUMINATION

(a) All walking and working areas shall be adequately illuminated.

(b) Portable lights shall meet the following requirements:

(1) Portable lights shall be equipped with substantial reflectors and guards to prevent flammable and other material from coming in contact with the bulb, except that guards are not required where the construction of the reflector is such that the bulb is deeply recessed.

(2) Portable lights shall be equipped with heavy duty electric cords and may be suspended by such cords only when the means of attachment of the cord to the light is such as to prevent the light from being suspended by the electrical connections. All connections and insulation shall be maintained in safe condition.

(3) Lighting wire and fixtures for portable lights shall be so arranged as to be free from contact with drafts, running gear, or other moving equipment.

(4) Portable lights shall be so arranged that they do not shine in the eyes of winchdrivers or hatchtenders.

(5) Portable cargo lights furnished by the employer for use aboard vessels and purchased after September 1, 1966, shall be listed as approved by the U.S. Coast Guard or shall bear the Underwriters' Laboratories, Inc., Marine Label.

(c) Employees shall not be permitted to enter dark holds, compartments, decks or other places without a flashlight or other suitable portable light. The use of matches or open flame lights is prohibited.

1918.93—VENTILATION AND ATMOSPHERIC CONDITIONS

(a) Ventilation requirements with respect to carbon monoxide:

(1)

(i) When internal combustion engines exhaust into a hold, an intermediate deck, or any other compartment, the employer shall see that tests of the carbon monoxide content of the atmosphere are made with such frequency as is found by test to be necessary in the type and location of the operation, and under the conditions existing, to insure that dangerous concentrations do not develop. Such tests shall be made in the area in which employees are working, by persons competent in the use of the test equipment and procedure. Where operations are located in a deep tank or refrigerated compartment, the first test shall be made within one-half hour of the time the machine(s) start.

(ii) The carbon monoxide content of the atmosphere shall be maintained at not more than 50 parts per million (0.005%) as a time weighted average, and employees shall be removed from the compartment if the carbon monoxide concentration exceeds 100 parts per million (0.01%). The term "time weighted average" means that for any period of time in which the concentration exceeds 50 parts per million, it shall be maintained at a corresponding amount below 50 parts per million for an equal period of time.

(iii) When neither natural ventilation nor the vessel's ventilating system, where fitted, is adequate to keep the carbon monoxide concentration within the allowable limits set forth in this paragraph, the employer shall use supplementary means of portable ventilation in such size and number and so arranged as to bring such concentration within such limits before work is resumed.

(2) A record of the date, time, location, and results of the tests required by subparagraph (1) of this paragraph shall be maintained for at least 30 days after the work is completed. The record shall be available for examination by representatives of the Occupational Safety and Health Administration.

(3) The intakes of portable blowers and any exposed belt drives shall be guarded adequately by screens.

(4) The frames of portable blowers shall be grounded at the source of the current either through a third wire in the cable containing the circuit conductors or through a separate wire. When the vessel is the source of the current the ground shall be made to the structure of the vessel. Electric cords used shall be free of visible defects.

(5) The employer shall not permit the use of shore electrical circuits unless they have been checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current. When the vessel is the source of the current, it is required only that a check be made to ensure good electrical contact between the ground wire and the vessel's structure.

(b)

(1) Before commencing to load grain which has been fumigated, the employer shall ascertain from the elevator operator that the cargo is free from hazardous concentrations of fumigants.

(2) The employer shall not load tobacco until the carrier has provided written notification as to whether or not the cargo has been fumigated. If the tobacco has been fumigated with any toxic fumigant, the employer shall not commence loading until written warranty has been received from the fumigation facility that the aeration of the cargo has been such as to reduce the concentration of the fumigant to a safe limit. Such notification and warranty shall be maintained for at least 30 days after the loading of the tobacco has been completed, and shall be available for examination by representatives of the Occupational Safety and Health Administration.

(3) Before commencing to load cargo other than cargo mentioned in subparagraph (1) or (2) of this paragraph, which has been fumigated at the loading port, the employer shall ascertain that such cargo does not contain a hazardous concentration of fumigants.

(c) Before employees are permitted to enter or work in any stowage space or tank, the employer shall ascertain from the officer in charge of the vessel, or the vessel's agent or operator, whether explosive, poisonous, noxious, or gaseous cargoes have been carried or are stowed therein, or whether dry ice has been used as a refrigerant therein, or whether such places have been fumigated, or whether there is a possibility of oxygen deficiency. Upon establishing that any of such conditions may exist, the employer shall ascertain from the officer in charge of the vessel, if he is properly equipped and qualified so to evaluate, the condition of the work place with respect to atmospheric contaminants or deficiencies. If the officer in charge of the vessel is not equipped or qualified to carry out such evaluation, this shall be done by another person qualified and equipped to do it.

(d) When it is ascertained as set forth in paragraph (c) of this section that the atmosphere in which employees would be working is immediately dangerous to life, or if the atmosphere becomes immediately dangerous to life during cargo handling operations, no employee shall be permitted to enter or remain in the work place until the atmospheric condition has been made safe. Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or the high concentration of contaminants, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(e) When it is ascertained as set forth in paragraph (c) of this section that the atmosphere in which employees would be working contains dangerous gaseous contaminants not immediately dangerous to life, or if the atmosphere becomes so contaminated during cargo handling operations, no employee shall be permitted to enter or remain in the work place until the atmosphere is made safe, or the employees are protected by suitable respiratory protective equipment in accordance with the requirements of § 1918.102 (a) and (b). Dangerous gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period of time without endangering the life of a person breathing them, but might produce discomfort and injury after a prolonged single exposure or repeated short exposures.

(f) When employees are exposed to heavy concentrations of dusts, as in loading bulk grain, they shall be protected by suitable respiratory protective equipment in accordance with the requirements of § 1918.102 (a) and (c).

1918.94—SANITATION AND DRINKING WATER

(a) Longshoring operations shall not be carried on in the immediate vicinity of uncovered garbage or in the way of overboard discharges from sanitary lines unprotected by a baffle or splash boards.

(b) Clean drinking water in clean, covered containers shall be provided. Individual sanitary drinking cups or some other equally sanitary device shall be conveniently available.

1918.95—LONGSHORING OPERATIONS IN THE VICINITY OF REPAIR AND MAINTENANCE WORK

(a) Longshoring operations shall not be carried on when chipping or scaling of decks, bulkheads or sides of vessels creates excessive noise which interferes with communication of warnings or instructions.

(b) Longshoring operations shall not be carried on in the hold or on deck beneath men working in the rigging overhead when such overhead work creates a hazard of falling objects.

(c) Longshoring operations shall not be carried on where employees are exposed to injurious light rays, hot metal, or sparks, any of which result from welding or cutting.

(d) Longshoring operations shall not be carried on where employees are exposed to unsafe concentrations of dust or vapors from sand blasting or spray painting.

1918.96—FIRST AID AND LIFE SAVING EQUIPMENT

(a) Unless a first aid room is close at hand and a qualified attendant is prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier only one kit shall be required. The kit shall be kept in the immediate vicinity of the vessel and at least one employee holding a currently valid first aid certificate shall be close at hand.

(b) The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item. The contents of such kit shall include a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch and 2 inch.
Gauze compress bandages, 4 inch.
Adhesive bandages, 1 inch.
Triangular bandage, 40 inch.
Ammonia inhalants and ampules.
Antiseptic applicators or swabs.
Burn dressing.
Eye dressing.
Wire or thin board splints.
Forceps and tourniquet.

(c) The contents of the first aid kit shall be checked before being sent out on each job to ensure that all expended items have been replaced.

(d) There shall be available for each vessel being worked one Stokes basket stretcher, or its equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that there need be no more than two stretchers on each pier. Stretchers shall be kept close to the vessels.

(e) The employer shall ensure that there is in the vicinity of each vessel being worked at least one U.S. Coast Guard approved 30-inch lifering with not less than 90 feet of line attached and at least one portable or permanent ladder which will reach from the top of the apron to the surface of the water. If the above equipment is not available at the pier, the employer shall furnish it during the time that he is working the vessel. When working a barge, scow, raft, lighter, log boom, or carfloat alongside a ship, a U.S. Coast Guard approved 30-inch lifering, with not less than 90 feet of line, shall be provided either on the floating unit itself or aboard the ship in the immediate vicinity of each floating unit being worked.

(f) When employees are working on log booms or cribs, lifelines shall be furnished and hung overside to the water's edge.

1918.97—QUALIFICATION OF MACHINERY OPERATORS

(a) Only those employees considered by the employer to be competent by reason of training or experience, and who understand the signs, notices, and operating instructions and are familiar with the signal code in use shall be permitted to operate a crane, winch or other power-operated hoisting apparatus, or any power-operated vehicle, or to give signals to the operator of any hoisting apparatus.

(b) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him shall be permitted to operate a crane, winch or other power-operated hoisting apparatus or a power-operated vehicle.

(c) No minor under 18 years of age shall be employed in occupations involving the operation of any power-operated hoisting apparatus or assisting in such operations by performing work such as hooking on or landing drafts, rigging gear, etc.

1918.98—GRAIN FITTING

(a) Where employees are engaged in work on longitudinal bulkheads or shifting boards (other than longitudinal bulkheads of feeders) at a distance of eight (8) feet or more above any ceiling, tank top or deck, the following shall apply:

(1) If working off portable straight ladders the provisions of § 1918.25(f) of this Part shall apply.

(2) If working off staging, any lumber used in the construction thereof shall be sound, straight grained, free from cross grain, shakes, and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength. Platform planking used as a work surface shall not be less than 2 x 10 lumber and the width of the platform shall not be less than 18 inches.

(3) If working from other elevated positions, employees shall be protected from falling by safety belt and lifeline or other equivalent protection.

(b)

(1) When grain fitting operations are in progress in the square of an intermediate deck, the hatch covering at that deck shall be such as to cover the hatch except for the minimum open spaces necessary to perform the work.

(2) When coverings used to provide a temporary work surface are other than the vessels' hatch covers placed in their normal positions, they shall be of adequate strength and so placed or secured that they cannot be accidentally dislodged.

(c) When the erection of grain fittings requires employees to work on surfaces immediately adjacent to or between open deep tanks, either the deep tank covers shall be put in place, the opening covered by a net, or the opening guarded by a line, railing or net rigged as a railing, or by other suitable means.

(d) When removing hatch coverings from the interiors of feeders at the completion of their construction, or when removing or replacing hatch coverings in the interiors of feeders for any purpose at other times, employees engaged in this work shall be protected from falling by the use of adequate, individual lifelines, properly tended, or by nets or other means suitable for the purpose. Except for the minimum open spaces necessary, hatch coverings shall not be removed within feeders under construction until such construction is completed.

(e) When repair or other work is carried out in the interior of an existing feeder and circumstances do not allow the covering of the hatch at that deck, employees shall be protected from falling by the use of adequate individual lifelines, properly secured and if necessary tended, or by nets or other means suitable for the purpose.

(f) Such other sections of this part as are applicable to grain fitting operations shall be adhered to.

1918.99 Commercial diving operations

Commercial diving operations shall be subject to Subpart T of Part 1910, §§ 1910.401–1910.441, of this chapter.

[42 F.R. 37673, July 22, 1977.]

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PART 1918—LONGSHORING

SUBPART J—PERSONAL PROTECTIVE EQUIPMENT

1918.101 Eye protection.
1918.102 Respiratory protection.
1918.103 Protective clothing.
1918.104 Foot protection.
1918.105 Head protection.
1918.106 Protection against drowning.

EXHIBIT I—CARGO GEAR REGISTER AND CERTIFICATES

SUBPART J—PERSONAL PROTECTIVE EQUIPMENT

1918.101—EYE PROTECTION

(a) When, because of the nature of the cargo being handled, an eye hazard from flying particles or heavy dust exists, employees shall be protected by eye protection equipment meeting the specifications prescribed by the American National Standard (ANSI) Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1968).

(b) Eye protection equipment shall be maintained in good condition.

(c) Eye protection equipment which has previously been used shall be cleaned and disinfection before it is issued by the employer to another employee.

(d) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personal spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

1918.102—RESPIRATORY PROTECTION

(a) General.

(1) Except as provided in subparagraph (c) (3) of this section, respiratory protective equipment required by this part shall carry U.S. Bureau of Mines approval for the use intended. In cases where the U.S. Bureau of Mines does not issue approval against the particular hazard equipment shall be acceptable to the Occupational Safety and Health Administration. Respiratory protective equipment shall be used only for the purpose intended and no modification of the equipment shall be made.

(2) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(3) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) Employees required to use respiratory protective equipment shall be instructed in its use.

(b) Protection against gaseous contaminants not immediately dangerous to life.

(1) In concentrations of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister shall be used. Different canisters are approved for use against the following gases and groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide or combinations of the above.

(2) In low concentrations (less than 0.1 percent by volume, but above the Threshold Limit Value of the gas), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in subparagraph (1) of this paragraph shall be used.

(c) Protection against dusts.

(1) For protection against pneumoconiosis producing dusts, a respirator equipped with the type of filter approved for such purpose shall be used.

(2) For protection against toxic dusts, a respirator equipped with the type of filter approved for such purpose shall be used.

(3) For protection against nuisance dusts, a respirator equipped with the type of filter required in subparagraph (1) of this paragraph or a suitable dust mask shall be used.

1918.103—PROTECTIVE CLOTHING

(a) When employees are handling cargo which, due to ruptured, leaking or inadequate containers, may cause burns, skin irritation or be otherwise injurious to health, they shall be protected by suitable protective clothing.

(b) Protective clothing which has been previously worn shall be cleaned and disinfected before it is issued by the employer to another employee.

1918.104—FOOT PROTECTION

The employer shall arrange through means, such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use.

1918.105—HEAD PROTECTION

(a) Employees shall be protected by protective hats meeting the specifications contained in the American National Standard Safety Requirements for Industrial Head Protection, Z89.1 (1969).

(b) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

1918.106—PROTECTION AGAINST DROWNING

(a) Personal flotation devices. Any personal flotation device shall be approved by the United States Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or their equivalent, pursuant to 46 CFR 160 (Coast Guard Lifesaving Equipment Specifications) and 33 CFR 175.23 (Coast Guard table of devices equivalent to personal flotation devices).

(b) Employees working on log booms shall be protected by personal flotation devices meeting the requirements of § 1918.106(a).

(c) Except when engaged in loading or discharging ocean going vessels, employees walking or working on the decks of barges on the Mississippi River System and the Gulf Intracoastal

Waterway shall be protected by personal flotation devices meeting the requirements of § 1918.106(a).

(d) Personal flotation devices shall be maintained in good condition and shall be considered unserviceable when damaged so as to affect their buoyant properties or capability of being fastened.

[39 F.R. 15124, May 1, 1974.]

EXHIBIT I

CARGO GEAR REGISTER AND CERTIFICATES

The cargo gear register, designated Form I by the ILO, is a booklet containing instructions and forms on which the following information is recorded:

Part I. Annual Inspection and Quadrennial Thorough Examination of Derricks and Permanent Attachments (including Bridle Chains) to the Derricks, Masts and Decks.

Part II. Annual Thorough Examination of Cranes, Winches, Hoists, and Accessory Gear other than Derricks and Permanent Attachments Thereto.

Part III. Annual Thorough Examination of Gear which is Exempt from Heat Treatment.

Part IV. Heat Treatment of Chains, Rings, Hooks, Shackles and Swivels which Require such Treatment.

The following are the sample forms of certificates recommended by the ILO.

Test Certificate No. ------ Form No. 2

CERTIFICATE OF TEST AND EXAMINATION OF WINCHES, DERRICKS AND THEIR ACCESSORY GEAR, BEFORE BEING TAKEN INTO USE

(Form prescribed by --)

Name of ship on which machinery is fitted ------------------------

(1) Situation and description of machinery and gear, with distinguishing number or mark (if any)	(2) Angle to the horizontal of derrick boom while the load was applied (degrees)	(3) Proof load applied (tons)	(4) Safe working load at the angle shown in column 2 (tons)

(5) Name and address of public service, association, company or firm making the test and examination ------------------------------

----

(6) Position of signatory in public service, association, company, or firm --

I certify that on the---- day of ----------, 19--, the above machinery, together with its accessory gear, was tested by a competent person in the manner set forth on the reverse side of this certificate; that a careful examination of the said machinery and gear by a competent person after the test showed that it had withstood the proof load without injury or permanent deformation; and that the safe working load of the said machinery and gear is as shown in column 4.

(Date) -------------- (Signature) -------------

NOTE: "Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

[Reverse of Form 2]

INSTRUCTIONS

Every winch with the whole of the gear accessory thereto (including derricks, goosenecks, eye plates, eye bolts, or other attachments) shall be tested with a proof load which shall exceed the safe working load as follows:

Safe working load	*Proof load*
Up to 20 tons	25 percent in excess.
20–50 tons	5 tons in excess.
Over 50 tons	10 percent in excess.

The proof load shall be lifted with the ship's normal tackle with the derrick at an angle which should not be more than 15 degrees to the horizontal, or, when this is impracticable, at the lowest practicable angle. The angle at which the test was made should be stated in the certificate of test. After the proof load has been lifted, it should be swung as far as possible in both directions.

As a general rule, all tests should be carried out in this way by dead load, and no exception should be allowed in the case of gear on new ships. In the case of replacements or renewal, however, spring or hydraulic balances may be used where dead loads are not available. Where a spring or hydraulic balance is used it shall be accurate, and the test should not be regarded as satisfactory unless the indicator remains constant for a period of at least five minutes.

After being tested as aforesaid, all lifting machinery, with the whole of the gear accessory thereto shall be examined to see whether any part has been injured or permanently deformed by the test.

The safe working load shown in column 4 is applicable only to a swinging derrick. When using fixed derricks, such as "union purchase" rigs, the safe working load should as a general rule be reduced; in any case, it should be determined with due regard to the actual conditions of use.

In the case of heavy derricks, care should be taken that the appropriate shrouds and stays are rigged.

NOTE: The expression "ton" means a ton of 1,000 kg or 2,200 lb.

Test Certificate No. ______ Form No. 3

CERTIFICATE OF TEST AND EXAMINATION OF CRANES OR HOISTS, AND THEIR ACCESSORY GEAR BEFORE BEING TAKEN INTO USE

(Form prescribed by ____)

Name of ship on which machinery is fitted ________________________

(1) Situation and description of crane or hoist, with distinguishing number or mark (if any)	(2) For jib cranes radius at which the proof load was applied	(3) Proof load applied (tons)	(4) Safe working load (for jib cranes at radius shown in column 2) (tons)

(5) Name and address of public service, association, company or firm making the test and examination ________________________________

____

(6) Position of signatory in public service, association, company or firm

____

I certify that on the ------ day of -------- 19--, the above machinery, together with its accessory gear, was tested by a competent person in the manner set forth on the reverse side of this certificate; that a careful examination of the said machinery and gear by a competent person after the test showed that it had withstood the proof load without injury or permanent deformation; and that the safe working load of the said machinery and gear is as shown in column 4.

(Signature) --------------------

Date ----------------

NOTE: "Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

[Reverse of Form 3]

INSTRUCTIONS

Every crane and other hoisting machine, with its accessory gear, shall be tested with a proof load which shall exceed the safe working load as follows:

Safe working load	*Proof load*
Up to 20 tons	25 percent in excess.
20–50 tons	5 tons in excess.
Over 50 tons	10 percent in excess.

The proof load shall be lifted and swung as far as possible in both directions. If the jib of the crane has a variable radius, it should be tested with a proof load, as defined above, at the maximum and minimum radii of the jib. With hydraulic cranes where, owing to the limitation of pressure, it is impossible to lift a load 25 percent in excess of the safe working load, it will be sufficient to lift the greatest possible load.

After being tested, each crane or hoist, with the whole of the gear accessory thereto, shall be examined to see whether any part has been injured or permanently deformed by the test.

NOTE: The expression "ton" means a ton of 1,000 kg or 2,200 lb.

Test Certificate No. ------ Form No. 4

CERTIFICATE OF TEST AND EXAMINATION OF CHAINS, RINGS, HOOKS, SHACKLES, SWIVELS AND PULLEY BLOCKS

(Form prescribed by --)

(1) Distinguishing number or mark (if any)	(2) Description of gear*	(3) Number tested	(4) Date of test	(5) Proof load applied (tons)	(6) Safe working load (tons)

---

* The dimensions of the gear, the type of material of which it is made and, where applicable, the heat treatment received in manufacture should be stated (unless Form No. 6 is used for the purpose).

(7) Name and address of makers or suppliers ------------------

----

(8) Name and address of public service, association, company or firm making the test and examination --------------------------------

----

(9) Position of signatory in public service, association, company or firm

----

I certify that on the ---- day of ---------- 19--, the above gear was tested and examined by a competent person in the manner set forth on the reverse side of this certificate; that the examination showed that the said gear withstood the proof load without injury or deformation; and that the safe working load of the said gear is as shown in Column 6.

(Signature) ------------------

(Date) --------------

NOTE: "Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

[Reverse of Form 4]

INSTRUCTIONS

Chains, rings, shackles and other loose gear (whether accessory to a machine or not) shall be tested with a proof load equal to that shown against the article in the following table:

Article of gear	*Proof load*
Chain, ring, hook, shackle or swivel	100 percent in excess of the safe working load.
Pulley blocks:	
Single-sheave block --------------	300 percent in excess of the safe working load.
Multiple-sheave block with safe working load up to and including 20 tons.	100 percent in excess of the safe working load.
Multiple-sheave block with safe working load over 20 tons up to and including 40 tons.	20 tons in excess of the safe working load.
Multiple-sheave block with safe working load over 40 tons.	50 percent in excess of the safe working load.
Pitched chains used with hand-operated pulley blocks and rings, hooks, shackles or swivels permanently attached thereto.	50 percent in excess of the safe working load.
Hand-operated pulley blocks used with pitched chains and rings, hooks, shackles or swivels permanently attached thereto.	50 percent in excess of the safe working load.

After being tested, all the gear shall be examined, the sheaves and the pins of the pulley blocks being removed for the purpose, to see whether any part has been damaged or permanently deformed by the test.

NOTE: The expression "ton" means a ton of 1,000 kg or 2,200 lb.

Test Certificate No. ------ Form No. 5

CERTIFICATE OF EXAMINATION AND TEST OF WIRE ROPE BEFORE BEING TAKEN INTO USE

(Form prescribed by --)

Name and address of maker or supplier of rope --------------------

----

Circumference/diameter* of rope ------------------------------

Number of strands ______
Number of wires per strand ______
Lay ______
Quality of wire ______
Date of test of sample of rope ______
Load at which sample broke ______
Safe working load, subject to any stated qualifying conditions such as minimum pulley diameter, direct tensile load, etc ______
Name and address of public service, association, company or firm making the examination and test ______
______
Position of signatory in public service, association, company or firm making the examination and test ______
______

I certify that the above particulars are correct, and that the examination and test were carried out by a competent person.

(Signature) ______
(Date) ______

NOTE: "Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

* Delete what does not apply.

[Reverse of Form No. 5]

INSTRUCTIONS

Wire rope shall be tested by sample, a piece being tested to destruction, and the safe working loaa of running ropes shall not exceed one-fifth of the breaking load of the sample tested.

Certificate No. ______ Form No. 6

CERTIFICATE OF HEAT TREATMENT OF CHAINS, RINGS, HOOKS, SHACKLES AND SWIVELS WHICH REQUIRE SUCH TREATMENT

(Form prescribed by ______)

(1) Distinguishing number or mark	(2) Description of gear*	(3) Number of certificate of test and examination	(4) Number heat treated	(5) Date of heat treatment	(6) Nature of heat treatment given	(7) Defects found at inspection after heat treatment

*The dimensions of the gear, the type of material of which it is made, and the heat treatment received in manufacture should be stated.

(8) Name and address of public service, association, company or firm carrying out the heat treatment and inspection ______
______

(9) Position of signatory in public service, association, company or firm
______

I certify that on the date shown in Column 5, the gear referred to in Columns 1 to 4 was heat-treated (indicated in Column 6) under my supervision; that after being so heat-treated every article was carefully inspected, and that no defects affecting its safe working condition were found other than those indicated in Column 7.

(Signature) ....

(Date) ....

NOTES: "Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

For requirements as to heat treatment, see reverse side.

[Reverse of Form No. 6]

INSTRUCTIONS

Annealing

Chains (other than bridle chains attached to derricks or masts), rings, hooks, shackles and swivels made of wrought iron, used in hoisting or lowering, shall be annealed at the following intervals:

	If used on lifting machinery driven by power	If used solely on lifting machinery worked by hand
Half-inch (12.5 mm) and smaller chains, rings, hooks, shackles and swivels in general use.	6 months....	12 months.
All other chains, rings, hooks, shackles and swivels in general use	12 months....	2 years.

Other Heat Treatment

Chains, rings, hooks, shackles and swivels made of material other than wrought iron shall be heat treated in accordance with procedures approved by the competent authority.

Certificate No. ...... Form No. 7

CERTIFICATE OF ANNUAL THOROUGH EXAMINATION OF GEAR WHICH DOES NOT REQUIRE TO BE PERIODICALLY HEAT TREATED

(Form prescribed by ....)

(1) Distinguishing number or mark	(2) Description of gear*	(3) Number of certificate of test and examination	(4) Remarks

*The dimensions of the gear, the type of material of which it is made, and the heat treatment received in manufacture should be stated.

(5) Name and address of public service, association, company or firm

making the test and examination ------------------------------------

----

(6) Position of signatory in public service, association, company or firm

----

I certify that on the -------- day of ---------- 19___, the above gear was thoroughly examined by a competent person, and that no defects affecting its safe working condition were found other than those indicated in Column 4.

(Signature) ------------------

(Date) ------------------

NOTES: This certificate is optional. The above particulars may be entered in Part III of the Register (Form No. 1).

"Competent person" means a person acceptable as such to the competent authority in the country of issue of the certificate.

For list of gear not required to be heat-treated and definition of "thorough examination," see reverse side.

[Reverse of Form No. 7]

INSTRUCTIONS

Gear not required to be heat treated, but required to be thoroughly examined by a competent person once at least in every twelve months:

Plate-link chains.

Pitched chains.

Rings, hooks, shackles and swivels permanently attached to pitched chains, pulley blocks or weighing machines.

Hooks and swivels having ball bearings or other case-hardened parts.

Bordeaux connections.

Other gear exempted by the competent authority, as follows:

NOTE: "Thorough examination" means a visual examination, supplemented if necessary by other means such as a hammer test, carried out as carefully as conditions permit in order to arrive at a reliable conclusion as to the safety of the parts examined; if necessary for the purpose, parts of the machines or gear must be dismantled.

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Designation	1915.10(a), 1916.10(a), 1917.10(a).
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MARITIME STANDARDS—Continued

Subject term	Section No.
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Compliance Responsibility	1918.2.
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Frequent Checks of Employee	1915.54, 1916.54, 1917.54.
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Painting	1915.24(a)(1), 1916.24(a)(1).
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Controls	1918.69 (a), (b), (d).
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Ashore, Guarding Swing Radius	1918.74(a)(10).
Certification, Afloat	1918.12(a).
Certification, Ashore	1918.13(a).
Certification, Container	1918.14.
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Definition	1918.3(r)(1).
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Illumination	1918.74(a)(11).
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D

Subject term	Section No.
Dangerous Atmospheres: (see Atmospheres, Flammable and Toxic Substances, and Toxic Solvents).	
Deck Loads:	
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Handlines	1918.41(a).
Ladders	1918.25(e).
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Confined Space	1915.2(m), 1916.2(m), 1917.2(m).
Crane	1918.3(r)(1).
Derrick	1918.3(r)(2).
Employee	1915.2(d), 1916.2(d), 1917.2(d), 1918.3(d).
Employer	1915.2(c), 1916.2(c), 1917.2(c), 1918.3(c).
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Gangway	1915.2(e), 1916.2(e), 1917.2(e), 1918.3(k).
Hazardous Cargo	1918.3(s).
Hazardous Material	1915.2(s), 1916.2(s), 1917.2(r).
Hazardous Substance	1915.2(k), 1916.2(k), 1917.2(k).
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Subject term	Section No.
Intra Coastal Waterway	1918.3(p).
Longshoring Operations	1918.3(i).
Mississippi River System	1918.3(o).
Portable Unfired Pressure Vessel	1915.2(q), 1916.2(q).
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Public Vessel	1918.3(f).
Related Employments	1915.2(j), 1916.2(j), 1917.2(i), 1918.3(j).
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Ship Cargo Handling Gear	1918.3(m).
Ship Repair	1915.2 (i).
Shipbreaking	1917.2(i).
Shipbuilding	1916.2(i).
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Vessel	1915.2(f), 1916.2(f), 1917.2(f), 1918.3(e).
Derricks:	
Certification, Afloat	1918.12(a).
Certification, Ashore	1918.13(a).
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Visible Defects	1918.74(a)(8).
Drafts:	
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Double Slings	1918.81(c).
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Placement on Deck	1918.91(e).
Racked Against Sweat Battens	1918.91(f).
Slinging	1918.81(c).
Stowage	1918.91(g).
Dusts:	
Heavy Concentration	1918.93(f).
Protection	1918.93(f), 1918.102(c).
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E

Subject term	Section No.
Edge, Guarded	1918.32(b).
Electrical Circuits: (see Explosion-Proof Lights, Grounding, and Portable Lamps).	
Requirements	1915.111, 1916.111.
Electrical Circuits: (see Grounding, Explosion-Proof Lights and Portable Lamps).	
Enclosed Spaces:	
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Welding, Cutting or Heating, Coatings	1915.33, 1916.33(c), 1917.33.
Welding, Cutting or Heating Metals, Toxicity	1915.31(c), 1916.31(c), 1917.31(c).
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Required	1918.101(a).
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F

Subject term	Section No.
Falls (Runners):	
Chafing	1918.54(d).
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Eyes	1918.52(c)(3).
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Subject term — Section No.

- Welding ... 1915.32, 1916.32, 1917.32.

First Aid:
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- Inspection ... 1915.58(c), 1916.58(c), 1917.58(c), 1918.96(c).
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Flammable and Toxic Substances: (see Atmospheres and Toxic Solvents).
- Cold Work ... 1915.12(a)(3), (4); 1917.12(a)(1).
- Hot Work ... 1915.13(c), 1917.13(b).
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- Hot Work on Hollow Structures ... 1915.34(c), 1916.34, 1917.34(c).
- Precautions ... 1915.25(a), 1916.25(a).
- Solvents ... 1915.21(c), 1916.21(c).

Foot Protection ... 1915.83(d), 1916.83(d), 1917.83(d), 1918.104.

Fumigation:
- Cargo ... 1918.93(b)(3).
- Grain ... 1918.93(b)(1).
- Stowage Spaces ... 1918.93(c).
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G

Gangways:
- Access, Floating Drydocks ... 1915.45, 1916.45, 1917.45.
- Access, Vessels ... 1915.44, 1916.44, 1917.44.
- Coast Guard Inspection ... 1918.11(c).
- Definition ... 1915.2(e), 1916.2(e), 1917.2(e), 1918.3(k).
- Duckboards ... 1918.21(b).
- General Requirements ... 1918.11(a), (b).
- Illumination ... 1915.44(a)(11), 1916.44(a)(10), 1917.44(a)(1), 1918.21(h).
- Loads ... 1918.21(i).
- Nets ... 1918.21(c).
- Obstructions ... 1915.44(a)(10), 1916.44(a)(9), 1917.44(a)(9), 1918.21(g).
- Rail Heights ... 1915.45(b), 1916.45, 1917.45(b).
- Railing ... 1918.11(b).
- Stanchions ... 1918.11(b).
- Substitutes ... 1918.11(a).
- Supporting Bridles ... 1915.44(a)(8), 1916.44(a)(7), 1917.44(a)(7), 1918.21(e).
- Trimming ... 1918.21(a).
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- Walking Surfaces ... 1918.11(a).
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- Hazardous Residues ... 1915.14(d), 1917.14(d).
- Hot Work ... 1915.14(b), (e); 1917.14(b).
- Informing Crew ... 1915.14(c), 1917.14(c).
- Spaces ... 1915.14(a), 1917.14(a).

Gas Welding and Cutting:
- Fuel Gases ... 1915.35(d), 1916.35(d), 1917.35(d).
- Hose ... 1915.35(f), 1916.35(f), 1917.35(f).
- Manifolds ... 1915.35(e), 1916.35(c), 1917.35(e).
- Placement and Treatment of Cylinders ... 1915.35(b), (c); 1916.35(b), (c); 1917.35(b), (c).
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- Inspection ... 1915.61(a), 1916.61(a), 1917.61(a), (b).
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Subject term	Section No.
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Foreign Vessels	1918.12(d).
Jurisdiction Transfer	1918.13(f).
Maintenance	1918.13(h).
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Stoppers, Clamp	1918.52(b)(3).
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Grain Fitting:	
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Portable Electric Tools	1915.72(a), 1916.72(a), 1917.72(a).
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Powder Actuated Tools	1915.75(a)(6), 1916.75(a)(3), (6).
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Placement	1918.54(a).
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H	
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Hinged or Folding	1918.43(h).
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Definition	1915.2(k), 1916.2(k), 1917.2(k).
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Subject term	Section No.
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Hoses:	
Abrasive Blasting	1915.23(c), (i); 1916.23(c).
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Steam	1915.53(a), 1916.53(a), 1917.53(a).
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Subject term	Section No.
Housekeeping:	
Access	1915.51(d), 1916.51(d), 1917.51(c).
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I	
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K	
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L	
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Access, Staging	1915.41(j), 1916.41(j), 1917.41(f).
Access, Vessels	1915.44, 1916.44, 1917.44.
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Portable Wood, Construction of	1915.42(b), 1916.42(b), (c); 1917.42(b).
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Ladders, Jacob's:	
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Subject term	Section No.
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Precautions	1915.56(a), 1916.56, 1917.56.
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Requirements	1915.84(a), 1916.84(a), 1917.84(a).
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Lifelines:	
Requirements	1915.84(b), 1916.84(b), 1917.84(b), 1918.96(f).
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Lights:	
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M	
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Abrasive Blasting	1915.23(c), 1916.23(c).
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N	
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O	
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P	
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Grounding	1915.72(a), (b); 1916.72(a), (b); 1917.72(a), (b).
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Switches	1915.72(c), 1916.72(c), 1917.72(c).
Portable Lamps:	
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Appendix B

OCCUPATIONAL SAFETY AND HEALTH STANDARDS, REGULATIONS, AND PROCEDURES

CONTENTS OF ALL VOLUMES

Occupational Safety and Health Standards, Regulations, and Procedures are contained in five volumes. Volumes I, II, and III include standards for general industry, the maritime industry, and the construction industry, respectively. Volume IV includes all other regulations, rules, and procedures for implementing the Act. Volumes V and VI include procedures and guidelines for the conduct of compliance operations. The major parts and subparts of each volume are as follows:

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H Materials Handling, Storage Use, and Disposal

I Tools—Hand and Power

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1901	Procedures for State Agreements.
1902	State Plans for the Development and Enforcement of State Standards.
1903	Inspections, Citations and Proposed Penalties.
1904	Recording and Reporting Occupational Injuries and Illnesses.
1905	Rules of practice for Variances, Limitations, Variations, Tolerances, and Exemptions under the Williams-Steiger Occupational Safety and Health Act of 1970.
1906	Administration Witnesses and Documents in Private Litigation.
1907	Accreditation of Testing Laboratories.
1908	On-Site Consultation Agreements.
1911	Rules of Procedure for Promulgating, Modifying, and Revoking Occupational Safety or Health Standards.
1912	Advisory Committees on Standards.
1912a	National Advisory Committee on Occupational Safety and Health.
1913	Disclosure of Information.
1919	Gear Certification.

1920	Procedure for Variations from Safety and Health Regulations under Longshoremen's and Harbor Worker's Compensation Act.
1921	Rules of Practice in Enforcement Proceedings under Section 41 of the Longshoremen's and Harbor Workers' Compensation Act.
1922	Investigational Hearings under Section 41 of the Longshoremen's and Harbor Workers' Compensation Act.
1923	Safety and Health Provisions for Federal Agencies.
1924	Safety Standards Applicable to Workshops and Rehabilitation Facilities Assisted by Grants.
1925	Safety and Health Provisions for Federal Service Contracts.
1950	Development and Planning Grants for Occupational Safety and Health.
1951	Grants for Implementing Approved State Plans.
1952	Approved State Plans for Enforcement of State Standards.
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1954	Procedures for the Evaluation and Monitoring of approved State Plans.
1955	Procedures for Withdrawal of Approval of State Plans.
1956	State Plans for the Development and Enforcement of State Standards Applicable to State and Local Government Employees in States Without Approved Private Employee Plans.
1960	Safety and Health Provisions for Federal Employees.
1975	Coverage of Employers under the Williams-Steiger Occupational Safety and Health Act of 1970.
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1999	Procedures for the Preparation and Circulation of Environmental Impact Statements.
2100	Ethics and Conduct of OSAHRC Employees.
2200	Occupational Safety and Health Review Commission, Part 2200 for Rules of Procedure.
2300	OSAHRC Regulations Implementing the Freedom of Information Act.
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80 Administrative Functions, Practices, and Procedures.

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OSHA INSTRUCTION
STD 2-1.1
10/30/78

SUBJECT: 1918.65(b); Meaning of the Word "Aloft"

Purpose. To clarify applicability of 1918.65(b) and meaning of the word "aloft."

Background. It has come to our attention that the intent of subject regulation is being misunderstood.

Action: The intent of the regulation is to require mousing (or seizing) of screw pin shackles when the shackle is situated in an inaccessible place, that is, aloft. Aloft, in the maritime industry means on or in the higher rigging of the ship. This regulation is not to be applied to the cargo hook assembly or to any stevedoring or other gear which may be hanging from the hook or from the falls.

Effective Date. This instruction is effective immediately, and will remain in effect until canceled or superseded.

OSHA INSTRUCTION
STD 2-1.2
10/30/78

SUBJECT: 1918.85(b)(3), (4), and (5)

Purpose. To provide guidance on the effect and application of Sections 1918.85(b)(3), (4), and (5).

Background. Due to an apparent conflict in the contents of Section 1918.85(b)(3) and 1918.85 (b)(5), there is a need for clarification as to the application of these sections.

Action. Sections 1918.85(b)(3), (4), and (5) deal with two situations: (1) When an outbound container arrives at a terminal having been fully loaded or consolidated (elsewhere) and ready to be placed on board; and (2) when an outbound container is loaded or has to have its load completed at the terminal before it is ready to be placed on board.

a. (1). In the first situation the fully loaded container must be weighed (1) if there are scales at the terminal; (2) if there are scales reasonably accessible to the terminal. Only if there are no scales so available in these circumstances may the actual gross weight of the container as loaded for shipment by sea be calculated according to the requirements of Section 1918.85(b)(5).

a. (2). In the second situation, when a container is completed or consolidated at the terminal it must be weighed (1) if there are scales at the terminal, or (2) if there are scales at a location reasonably accessible from the terminal. Only when there are no scales either at the terminal or reasonably accessible from the terminal may the actual gross weight of the container as loaded for shipment by sea be calculated according to the provisions of Section 1918.85(b)(5).

a. (3). The CSHO, when conducting an inspection of a terminal where the weights of the containers are calculated, may at his discretion cause the random sample weight check to be carried out at the nearest weighing facility.

b. For the purpose of Section 1918.85(b)(5), the term "reasonably accessible location" cannot as a practical matter be further defined in the regulation because of different local circumstances. Local staff must make a decision based on those circumstances and after using good judgment in considering all factors involved.

Effective Date. This instruction is effective immediately, and will remain in effect until canceled or superseded.

OSHA INSTRUCTION
STD 2-1.3
10/30/78

SUBJECT: 1918.85(b)(3), (4), and (5).

Purpose. To provide guidance on the application of 1918.85(b)(3), (4), and (5) to containers carrying automobiles.

Action.

a. Section 1918.85(b)(3) exempts open type vehicle carrying containers from the requirements of Section 1918.85(b)(4), and (5).

b. The reason for this exception is that it is well known in the industry that the maximum weight of the vehicles carried in an open type vehicle carrying containers does not come close to the maximum cargo weight the container is capable of carrying. The exception refers only to open type vehicle carrying containers because these are specificially built to carry vehicles. However, closed dry van containers are also used to carry vehicles. The reasons for the exception in favor of open type vehicle carrying containers apply as well to closed van containers carrying vehicles. Therefore, the exemption applies also to closed dry van containers carrying vehicles, provided that the container carries only completely assembled vehicles and no other cargo and the container is marked on the outside in such a manner that an employee can readily discern that the container is carrying vehicles.

Effective Date. This instruction is effective immediately, and will remain in effect until canceled or superseded.

OSHA INSTRUCTION
STD 2-1.4A
11/2/79

SUBJECT: 1918.74(a)(9)

Purpose. This instruction clarifies whether the revocation of the crane load indicating device requirement from the Construction standards affects the Maritime standards.

Action. The revocation of the crane load indicating device requirement from the Construction standards *does not* affect the requirement of the longshoring regulations, 29 CFR 1918.74(a)(9). This regulation is in effect and shall be enforced in the stevedoring industry.

OSHA INSTRUCTION
STD 2-1.6
10/30/78

SUBJECT: 1918.51(a) and (b)

Purpose. To provide information and guidance and to avoid the improper application of 1918.51(a) and (b) in this respect.

Action. The National Office has been advised that CSHO's are in some instances caused to make determinations concerning the SWL of ship's gear used in Union Purchase. CSHO's are to refrain from giving advice of this nature. It is not the function of OSHA, either at the field or national office level, to calculate stresses on a vessel's cargo gear and to assign SWL to that gear, nor is OSHA in a position to accept liability should any unauthorized "calculated ratings" prove to be the cause of accident.

Effective Date. This notice is effective immediately and will remain in effect until superseded or canceled.

OSHA INSTRUCTION
STD 2-1.7
10/30/78

SUBJECT: 1918.74(a)(9)(viii)(*d*).

Purpose. To provide guidance on the meaning of subject section.

Action. This standard has been erroneously interpreted to mean that if a crane is used exclusively to handle loads of less than 11,200 pounds, the load indicating device requirements of Section 1918.74(a)(9) do not apply. The regulation, Section 1918.74(a)(9)(viii)(*d*), means that *all* of the following conditions must be met before a crane can avoid the requirements for a load indicating device:

a. The crane must be used exclusively to handle cargo or equipment the total actual gross weight of which is known by means of marking of the unit or units hoisted;

b. Such total actual gross weight must never exceed 11,200 pounds; *and*

c. 11,200 pounds is less than the rated capacity of the crane at the maximum outreach that is possible under the conditions of use at the time.

Effective Date. This instruction is effective immediately, and will remain in effect until superseded or canceled.

OSHA INSTRUCTION
STD 2-1.8
10/30/78

SUBJECT: Responsibility Under 29 CFR 1918 for Compliance Affecting Equipment Used, but Not Owned by, or Under the Control of the Employer

Purpose. To provide guidance on the application of Part 1918 in subject circumstances. In order to avoid any tendency to misinterpret the means of application of the regulations of Part 1918, there is a need to restate responsibilities and the procedure to be followed.

Action.

a. If the equipment of a vessel or other equipment or facilities to be used by an employer, but not owned by the employer or under his control, does not meet the requirements of Part 1918, it is the responsibility of the employer not to permit his employees to utilize such equipment or facilities. He is in violation if, and only if, he does permit his employees to utilize such equipment or facilities.

b. It is not the responsibility of the employer under Part 1918 to effect corrections of any such deficiencies himself, but this does not relieve him of his duty to use only equipment which meets the requirements of Part 1918.

Effective Date. This instruction is effective immediately, and will remain in effect until canceled or superseded.

INTERPRETATION

October 11, 1972

STANDARD PROVISION: 29 CFR 1917.58

SUBJECT: First Aid Kits

1. Purpose. To clarify requirements for the types of first aid kits which comply with subject section and others listed below.

2. Background

a. The above section which specifies first aid kits states "The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item." Requests for clarification have been received as to whether the "commercial or cabinet-type" kit is as acceptable as the "unit-type" kit.

b. "Unit-type kits" have all items in the first aid kit individually wrapped, sealed and packaged in comparable size packages. The "commercial or cabinet-type kit" does not require all items to be individually wrapped and sealed, but only those which must be kept sterile. The items in the commercial or cabinet-type kit are not necessarily of uniform size.

3. Clarification. Items such as scissors, tweezers, tubes of ointment, or adhesive tape need not be individually wrapped, sealed or disposed of after a single application. Individual packaging and sealing should be required only for those items which must be kept sterile in a first aid kit recommended by a consulting physician.

4. Action. Commercial or cabinet-type first aid kits, as well as unit-type first aid kits, meet the requirements of compliance with regulations of the Occupational Safety and Health Administration.

Other Standard Provisions Affected:

29 CFR 1910.151
29 CFR 1915.58
29 CFR 1916.58
29 CFR 1918.96
29 CFR 1926.50
41 CFR 50-204.6

(100-13)

INTERPRETATION

October 11, 1972

STANDARD PROVISION: 29 CFR 1918.96

SUBJECT: First Aid Kits

1. Purpose. To clarify requirements for the types of first aid kits which comply with subject section and others listed below.

2. Background

a. The above section which specifies first aid kits states "The first aid kit shall consist of a weatherproof container with individual sealed packages for each type of item." Requests for clarification have been received as to whether the "commercial or cabinet-type" kit is as acceptable as the "unit-type" kit.

b. "Unit-type kits" have all items in the first aid kit individually wrapped, sealed and packaged in comparable size packages. The "commercial or cabinet-type kit" does not require all items to be individually wrapped and sealed, but only those which must be kept sterile. The items in the commercial or cabinet-type kit are not necessarily of uniform size.

3. Clarification. Items such as scissors, tweezers, tubes of ointment, or adhesive tape need not be individually wrapped, sealed or disposed of after a single application. Individual packaging and sealing should be required only for those items which must be kept sterile in a first aid kit recommended by a consulting physician.

4. Action. Commercial or cabinet-type first aid kits, as well as unit-type first aid kits, meet the requirements of compliance with regulations of the Occupational Safety and Health Administration.

Other Standard Provisions Affected:

29 CFR 1910.151
29 CFR 1915.58
29 CFR 1916.58
29 CFR 1917.58
29 CFR 1926.50
41 CFR 50-204.6

INTERPRETATION

November 7, 1972

STANDARD PROVISION: 29 CFR 1918.65(b)

SUBJECT: Meaning of the word "Aloft"

1. Purpose. To clarify applicability of 1918.65(b) and meaning of the word "aloft."

2. Background. It has come to our attention that the intent of subject regulation is being misunderstood.

3. Intent. The intent of the regulation is to require mousing (or seizing) of screw pin shackles when the shackle is situated in an inaccessible place, that is, aloft. Aloft, in the maritime industry, means on or in the higher rigging of the ship. This regulation is not to be applied to the cargo hook assembly or to any stevedoring or other gear which may be hanging from the hook or from the falls.

4. Action. The above should be used when conducting inspections in the longshoring industry.

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(3)

SUBJECT: Container Regulations

1. Purpose. To provide guidance on the effect and application of Sections 1918.85(b)(3), (4), and (5).

2. Background. Due to an apparent conflict in the contents of Section 1918.85(b)(3) and 1918.85(b)(5), there is a need for clarification as to the application of these sections.

3. Interpretation. Sections 1918.85(b)(3), (4), and (5) deal with two situations:

a. (1) When an outbound container arrives at a terminal having been fully loaded or consolidated (elsewhere) and ready to be placed on board; and (2) when an outbound container is loaded or has to have its load completed at the terminal before it is ready to be placed on board.

(1) In the first situation the fully loaded container must be weighed (1) if there are scales at the terminal; (2) if there are scales reasonably accessible to the terminal. Only if there are no scales so available in these circumstances may the actual gross weight of the container as loaded for shipment by sea be calculated according to the requirements of Section 1918.85(b)(5).

(2) In the second situation, when a container is completed or consolidated at the terminal it must be weighed (1) if there are scales at the terminal, or (2) if there are scales at a location reasonably accessible from the terminal. Only when there are no scales either at the terminal or reasonably accessible from the terminal may the actual gross weight of the container as loaded for shipment by sea be calculated according to the provisions of Section 1918.85(b)(5).

(3) The CSHO, when conducting an inspection of a terminal where the weights of the containers are calculated, may at his discretion cause the random sample weight check to be carried out at the nearest weighing facility.

(continued)

INTERPRETATIONS

b. For the purpose of Section 1918.85(b)(5), the term "reasonable accessible location" cannot as a practical matter be further defined in the regulation because of different local circumstances. Local staff must make a decision based on those circumstances and after using good judgment in considering all factors involved.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(4)
29 CFR 1918.85(b)(5)

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(4)

SUBJECT: Container Regulations

1. Purpose. To provide guidance on the effect and application of Sections 1918.85(b)(3), (4), and (5).

2. Background. Due to an apparent conflict in the contents of Section 1918.85(b)(3) and 1918.85(b)(5), there is a need for clarification as to the application of these sections.

3. Interpretation. Sections 1918.85(b)(3), (4), and (5) deal with two situations:

a. (1) When an outbound container arrives at a terminal having been fully loaded or consolidated (elsewhere) and ready to be placed on board; and (2) when an outbound container is loaded or has to have its load completed at the terminal before it is ready to be placed on board.

(1) In the first situation the fully loaded container must be weighed (1) if there are scales at the terminal; (2) if there are scales reasonably accessible to the terminal. Only if there are no scales so available in these circumstances may the actual gross weight of the container as loaded for shipment by sea be calculated according to the requirements of Section 1918.85(b)(5).

(2) In the second situation, when a container is completed or consolidated at the terminal it must be weighed (1) if there are scales at the terminal, or (2) if there are scales at a location reasonably accessible from the terminal. Only when there are no scales either at the terminal or reasonably accessible from the terminal may the actual gross weight of the container as loaded for shipment by sea be calculated according to the provisions of Section 1918.85(b)(5).

(3) The CSHO, when conducting an inspection of a terminal where the weights of the containers are calculated, may at his discretion cause the random sample weight check to be carried out at the nearest weighing facility.

(continued)

b. For the purpose of Section 1918.85(b)(5), the term "reasonable accessible location" cannot as a practical matter be further defined in the regulation because of different local circumstances. Local staff must make a decision based on those circumstances and after using good judgment in considering all factors involved.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(3)
29 CFR 1918.85(b)(5)

(100-17)

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(5)

SUBJECT: Container Regulations

1. Purpose. To provide guidance on the effect and application of Sections 1918.85(b)(3), (4), and (5).

2. Background. Due to an apparent conflict in the contents of Section 1918.85(b)(3) and 1918.85(b)(5), there is a need for clarification as to the application of these sections.

3. Interpretation. Sections 1918.85(b)(3), (4), and (5) deal with two situations:

a. (1) When an outbound container arrives at a terminal having been fully loaded or consolidated (elsewhere) and ready to be placed on board; and (2) when an outbound container is loaded or has to have its load completed at the terminal before it is ready to be placed on board.

(1) In the first situation the fully loaded container must be weighed (1) if there are scales at the terminal; (2) if there are scales reasonably accessible to the terminal. Only if there are no scales so available in these circumstances may the actual gross weight of the container as loaded for shipment by sea be calculated according to the requirements of Section 1918.85(b)(5).

(2) In the second situation, when a container is completed or consolidated at the terminal it must be weighed (1) if there are scales at the terminal, or (2) if there are scales at a location reasonably accessible from the terminal. Only when there are no scales either at the terminal or reasonably accessible from the terminal may the actual gross weight of the container as loaded for shipment by sea be calculated according to the provisions of Section 1918.85(b)(5).

(3) The CSHO, when conducting an inspection of a terminal where the weights of the containers are calculated, may at his discretion cause the random sample weight check to be carried out at the nearest weighing facility.

(continued)

b. For the purpose of Section 1918.85(b)(5), the term "reasonable accessible location" cannot as a practical matter be further defined in the regulation because of different local circumstances. Local staff must make a decision based on those circumstances and after using good judgment in considering all factors involved.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(3)
29 CFR 1918.85(b)(4)

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(3)

SUBJECT: Carriage of Automobiles in Containers

1. Purpose. To provide guidance on the application of 1918.85(b)(3), (4) and (5) to containers carrying automobiles.

2. Interpretation.

a. Section 1918.85(b)(3) exempts open type vehicle carrying containers from the requirements of Section 1918.85(b)(4), and (5).

b. The reason for this exception is that it is well known in the industry that the maximum weight of the vehicles carried in an open type vehicle carrying containers does not come close to the maximum cargo weight the container is capable of carrying. The exception refers only to open type vehicle carrying containers because these are specifically built to carry vehicles. However, closed dry van containers are also used to carry vehicles. The reasons for the exception in favor of open type vehicle carrying containers apply as well to closed van containers carrying vehicles. Therefore, the exemption applies also to closed dry van containers carrying vehicles, provided that the container carries only completely assembled vehicles and no other cargo and the container is marked on the outside in such a manner that an employee can readily discern that the container is carrying vehicles.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(4)
29 CFR 1918.85(b)(5)

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(4)

SUBJECT: Carriage of Automobiles in Containers

1. Purpose. To provide guidance on the application of 1918.85(b)(3), (4) and (5) to containers carrying automobiles.

2. Interpretation.

a. Section 1918.85(b)(3) exempts open type vehicle carrying containers from the requirements of Section 1918.85(b)(4), and (5).

b. The reason for this exception is that it is well known in the industry that the maximum weight of the vehicles carried in an open type vehicle carrying containers does not come close to the maximum cargo weight the container is capable of carrying. The exception refers only to open type vehicle carrying containers because these are specifically built to carry vehicles. However, closed dry van containers are also used to carry vehicles. The reasons for the exception in favor of open type vehicle carrying containers apply as well to closed van containers carrying vehicles. Therefore, the exemption applies also to closed dry van containers carrying vehicles, provided that the container carries only completely assembled vehicles and no other cargo and the container is marked on the outside in such a manner that an employee can readily discern that the container is carrying vehicles.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(3)
29 CFR 1918.85(b)(5)

INTERPRETATION

December 21, 1972

STANDARD PROVISION: 29 CFR 1918.85(b)(5)

SUBJECT: Carriage of Automobiles in Containers

1. Purpose. To provide guidance on the application of 1918.85(b)(3), (4) and (5) to containers carrying automobiles.

2. Interpretation.

a. Section 1918.85(b)(3) exempts open type vehicle carrying containers from the requirements of Section 1918.85(b)(4), and (5).

b. The reason for this exception is that it is well known in the industry that the maximum weight of the vehicles carried in an open type vehicle carrying containers does not come close to the maximum cargo weight the container is capable of carrying. The exception refers only to open type vehicle carrying containers because these are specifically built to carry vehicles. However, closed dry van containers are also used to carry vehicles. The reasons for the exception in favor of open type vehicle carrying containers apply as well to closed van containers carrying vehicles. Therefore, the exemption applies also to closed dry van containers carrying vehicles, provided that the container carries only completely assembled vehicles and no other cargo and the container is marked on the outside in such a manner that an employee can readily discern that the container is carrying vehicles.

Other Standard Provisions Affected:

29 CFR 1918.85(b)(3)
29 CFR 1918.85(b)(4)

INTERPRETATION

December 29, 1972

STANDARD PROVISION: 29 CFR 1918.74(a)(9)

SUBJECT: Requirement for Crane Load-Indicating Devices

1. Purpose. To provide information and guidance on Section 1918.74(a)(9).

2. Background. Many questions have arisen concerning the revocation of the crane load-indicating device requirement from the construction standards and whether or not this revocation affects the maritime standards.

3. Information. The revocation of the crane load-indication device requirement from the construction standards does not affect the requirement as stated at Section 1918.74(a)(9) of the longshoring regulations. This regulation is in effect and is to be enforced in the stevedoring industry.

INTERPRETATION

January 22, 1973

STANDARD PROVISION: 29 CFR 1915

SUBJECT: Cranes and Derricks Covered by the Maritime Regulations

1. Purpose. To provide guidance on the applicable regulations affecting cranes and derricks engaged in operations covered by the maritime regulations.

2. Background. Several inquiries have been received concerning whether or not the standards in 1910, Subpart N, are applicable to the cranes and derricks used in the maritime industry.

3. Clarification

a. The general industry regulations, 1910.179, 1910.180, and 1910.181, contain standards covering cranes and derricks.

b. These standards do not affect cranes and derricks engaged in maritime operations covered by 1915, 1916, 1917, and 1918. The maritime regulations which contain specific sections relating to cranes and derricks, are to be used when answering questions and directing inquiries concerning cranes and derricks in the shipyard and longshoring industries.

Other Standard Provisions Affected:

29 CFR 1916
29 CFR 1917
29 CFR 1918

(100-20)

INTERPRETATION

January 22, 1973

STANDARD PROVISION: 29 CFR 1916

SUBJECT: Cranes and Derricks Covered by the Maritime Regulations

1. Purpose. To provide guidance on the applicable regulations affecting cranes and derricks engaged in operations covered by the maritime regulations.

2. Background. Several inquiries have been received concerning whether or not the standards in 1910, Subpart N, are applicable to the cranes and derricks used in the maritime industry.

3. Clarification

a. The general industry regulations, 1910.179, 1910.180, and 1910.181, contain standards covering cranes and derricks.

b. These standards do not affect cranes and derricks engaged in maritime operations covered by 1915, 1916, 1917, and 1918. The maritime regulations which contain specific sections relating to cranes and derricks, are to be used when answering questions and directing inquiries concerning cranes and derricks in the shipyard and longshoring industries.

Other Standard Provisions Affected:

29 CFR 1915
29 CFR 1917
29 CFR 1918

INTERPRETATION

January 22, 1973

STANDARD PROVISION: 29 CFR 1917

SUBJECT: Cranes and Derricks Covered by the Maritime Regulations

1. Purpose. To provide guidance on the applicable regulations affecting cranes and derricks engaged in operations covered by the maritime regulations.

2. Background. Several inquiries have been received concerning whether or not the standards in 1910, Subpart N, are applicable to the cranes and derricks used in the maritime industry.

3. Clarification

a. The general industry regulations, 1910.179, 1910.180, and 1910.181, contain standards covering cranes and derricks.

b. These standards do not affect cranes and derricks engaged in maritime operations covered by 1915, 1916, 1917, and 1918. The maritime regulations which contain specific sections relating to cranes and derricks, are to be used when answering questions and directing inquiries concerning cranes and derricks in the shipyard and longshoring industries.

Other Standard Provisions Affected:

29 CFR 1915
29 CFR 1916
29 CFR 1918

INTERPRETATION

January 22, 1973

STANDARD PROVISION: 29 CFR 1918

SUBJECT: Cranes and Derricks Covered by the Maritime Regulations

1. Purpose. To provide guidance on the applicable regulations affecting cranes and derricks engaged in operations covered by the maritime regulations.

2. Background. Several inquiries have been received concerning whether or not the standards in 1910, Subpart N, are applicable to the cranes and derricks used in the maritime industry.

3. Clarification

a. The general industry regulations, 1910.179, 1910.180, and 1910.181, contain standards covering cranes and derricks.

b. These standards do not affect cranes and derricks engaged in maritime operations covered by 1915, 1916, 1917, and 1918. The maritime regulations which contain specific sections relating to cranes and derricks, are to be used when answering questions and directing inquiries concerning cranes and derricks in the shipyard and longshoring industries.

Other Standard Provisions Affected:

29 CFR 1915
29 CFR 1916
29 CFR 1917

INTERPRETATION

February 5, 1973

STANDARD PROVISION: 29 CFR 1918.74(a)(9)(viii)(d)

SUBJECT: Application of Load-Indicating Device Requirement

1. Purpose. To provide guidance on the meaning of Section 1918.74(a)(9)(viii)(d).

2. Background. This standard has been erroneously interpreted to mean that if a crane is used exclusively to handle loads of less than 11,200 pounds, the load indicating device requirements of Section 1918.74 (a)(9) do not apply.

3. Interpretation. The regulation, Section 1918.74(a)(9)(viii)(d), means that all of the following conditions must be met before a crane can avoid the requirements for a load indicating device:

a. The crane must be used exclusively to handle cargo or equipment the total actual gross weight of which is known by means of marking of the unit or units hoisted;

b. Such total actual gross weight must never exceed 11,200 pounds; and

c. 11,200 pounds is less than the rated capacity of the crane at the maximum outreach that is possible under the conditions of use at the time.

(100-21)

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972/ch.6

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VOLUME II- MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 6—FEBRUARY 1, 1982

OSHA 2078

INTRODUCTION

This change updates the introduction to this manual.

INSTRUCTIONS

1. Substitute or add the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	*INSERT CHANGE PAGE*
Title/A	Title/A
v/vi	v thru viii

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

L 35.6/3-2:

972/Ch. 7

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 7—FEBRUARY 26, 1982

OSHA 2078

INTRODUCTION

This change corrects references to appendix C, Interpretations.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	*INSERT CHANGE PAGE*
Title/A	Title/A
1/2	1/2
49/50	49/50
81/82	81/82
127/128	127/128
159/160	159/160
195/196	195/196
241/242	241/242
271/272	271/272
301 thru 304	301 thru 304

2. Enter a record of this change on page i.
3. Retain this cover sheet as a record of the contents of this change.

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 8—JULY 30, 1982

OSHA 2078

INTRODUCTION

This change reflects the changes affected by the consolidation program for the maritime industry standards. Previously, standards for ship repairing, shipbuilding, and shipbreaking were separately treated in parts 29CFR1915, 1916, and 1917 respectively. These parts are now consolidated in a new part 29CFR1915 covering all facits of shipyard employment, and parts 29CFR1916 and 1917 are removed. See 47 F.R. 16983, April 20, 1982. Part 29CFR1918, longshoring, remains unchanged.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	INSERT CHANGE PAGE
Title/A	Title/A
iii thru viii	iii thru viii
1 thru 86	1 thru 86
87 thru 216	Deleted

2. Enter a record of this change on page i.

3. Retain this cover sheet as a record of the contents of this change.

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VOLUME II-MARITIME STANDARDS AND INTERPRETATIONS

CHANGE 9–SEPTEMBER 17, 1982

OSHA 2078

INTRODUCTION

This change updates subject index to reflect change in the text of the manual.

INSTRUCTIONS

1. Substitute the attached pages as indicated in the following table:

REMOVE EXISTING PAGE	INSERT CHANGE PAGE
Title/A	Title/A
285 thru 292	285 thru 292
293 thru 296	Deleted

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OCCUPATIONAL SAFETY AND HEALTH

VOLUME II

MARITIME
STANDARDS AND INTERPRETATIONS

Change 9
September 17, 1982

OCTOBER, 1972

UNITED STATES DEPARTMENT OF LABOR
Raymond J. Donovan, Secretary
Occupational Safety and Health Administration
Thorne Auchter, Assistant Secretary

LIST OF EFFECTIVE PAGES

TOTAL NUMBER OF PAGES IS **188** AS FOLLOWS:

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